Nokia Customer Care

Service Manual

RH-86; RH-87 (Nokia 2610)

Mobile Terminal

Part No: 9250827 (Issue 1)

COMPANY CONFIDENTIAL

NOKIA

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Amendment Record Sheet

Amendment No	Date	Inserted By	Comments
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IMPORTANT

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Warnings and cautions

Warnings

- IF THE DEVICE CAN BE INSTALLED IN A VEHICLE, CARE MUST BE TAKEN ON INSTALLATION IN VEHICLES FITTED WITH ELECTRONIC ENGINE MANAGEMENT SYSTEMS AND ANTI-SKID BRAKING SYSTEMS. UNDER CERTAIN FAULT CONDITIONS, EMITTED RF ENERGY CAN AFFECT THEIR OPERATION. IF NECESSARY, CONSULT THE VEHICLE DEALER/ MANUFACTURER TO DETERMINE THE IMMUNITY OF VEHICLE ELECTRONIC SYSTEMS TO RF ENERGY.
- THE PRODUCT MUST NOT BE OPERATED IN AREAS LIKELY TO CONTAIN POTENTIALLY EXPLOSIVE ATMOSPHERES, FOR EXAMPLE, PETROL STATIONS (SERVICE STATIONS), BLASTING AREAS ETC.
- OPERATION OF ANY RADIO TRANSMITTING EQUIPMENT, INCLUDING CELLULAR TELEPHONES, MAY INTERFERE WITH THE FUNCTIONALITY OF INADEQUATELY PROTECTED MEDICAL DEVICES. CONSULT A PHYSICIAN OR THE MANUFACTURER OF THE MEDICAL DEVICE IF YOU HAVE ANY QUESTIONS. OTHER ELECTRONIC EQUIPMENT MAY ALSO BE SUBJECT TO INTERFERENCE.
- BEFORE MAKING ANY TEST CONNECTIONS, MAKE SURE YOU HAVE SWITCHED OFF ALL EQUIPMENT.

Cautions

- Servicing and alignment must be undertaken by qualified personnel only.
- Ensure all work is carried out at an anti-static workstation and that an anti-static wrist strap is worn.
- Ensure solder, wire, or foreign matter does not enter the telephone as damage may result.
- Use only approved components as specified in the parts list.
- Ensure all components, modules, screws and insulators are correctly re-fitted after servicing and alignment.
- Ensure all cables and wires are repositioned correctly.
- Never test a mobile phone WCDMA transmitter with full Tx power, if there is no possibility to perform the measurements in a good performance RF-shielded room. Even low power WCDMA transmitters may disturb nearby WCDMA networks and cause problems to 3G cellular phone communication in a wide area.
- During testing never activate the GSM or WCDMA transmitter without a proper antenna load, otherwise GSM or WCDMA PA may be damaged.

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For your safety

QUALIFIED SERVICE

Only qualified personnel may install or repair phone equipment.

ACCESSORIES AND BATTERIES

Use only approved accessories and batteries. Do not connect incompatible products.

CONNECTING TO OTHER DEVICES

When connecting to any other device, read its user's guide for detailed safety instructions. Do not connect incompatible products.

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Care and maintenance

This product is of superior design and craftsmanship and should be treated with care. The suggestions below will help you to fulfil any warranty obligations and to enjoy this product for many years.

- Keep the phone and all its parts and accessories out of the reach of small children.
- Keep the phone dry. Precipitation, humidity and all types of liquids or moisture can contain minerals that will corrode electronic circuits.
- Do not use or store the phone in dusty, dirty areas. Its moving parts can be damaged.
- Do not store the phone in hot areas. High temperatures can shorten the life of electronic devices, damage batteries, and warp or melt certain plastics.
- Do not store the phone in cold areas. When it warms up (to its normal temperature), moisture can form inside, which may damage electronic circuit boards.
- Do not drop, knock or shake the phone. Rough handling can break internal circuit boards.
- Do not use harsh chemicals, cleaning solvents, or strong detergents to clean the phone.
- Do not paint the phone. Paint can clog the moving parts and prevent proper operation.
- Use only the supplied or an approved replacement antenna. Unauthorised antennas, modifications or attachments could damage the phone and may violate regulations governing radio devices.

All of the above suggestions apply equally to the product, battery, charger or any accessory.

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ESD protection

Nokia requires that service points have sufficient ESD protection (against static electricity) when servicing the phone.

Any product of which the covers are removed must be handled with ESD protection. The SIM card can be replaced without ESD protection if the product is otherwise ready for use.

To replace the covers ESD protection must be applied.

All electronic parts of the product are susceptible to ESD. Resistors, too, can be damaged by static electricity discharge.

All ESD sensitive parts must be packed in metallized protective bags during shipping and handling outside any ESD Protected Area (EPA).

Every repair action involving opening the product or handling the product components must be done under ESD protection.

ESD protected spare part packages MUST NOT be opened/closed out of an ESD Protected Area.

For more information and local requirements about ESD protection and ESD Protected Area, contact your local Nokia After Market Services representative.

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Battery information

Note: A new battery's full performance is achieved only after two or three complete charge and discharge cycles!

The battery can be charged and discharged hundreds of times but it will eventually wear out. When the operating time (talk-time and standby time) is noticeably shorter than normal, it is time to buy a new battery.

Use only batteries approved by the phone manufacturer and recharge the battery only with the chargers approved by the manufacturer. Unplug the charger when not in use. Do not leave the battery connected to a charger for longer than a week, since overcharging may shorten its lifetime. If left unused a fully charged battery will discharge itself over time.

Temperature extremes can affect the ability of your battery to charge.

For good operation times with Ni-Cd/NiMh batteries, discharge the battery from time to time by leaving the product switched on until it turns itself off (or by using the battery discharge facility of any approved accessory available for the product). Do not attempt to discharge the battery by any other means.

Use the battery only for its intended purpose.

Never use any charger or battery which is damaged.

Do not short-circuit the battery. Accidental short-circuiting can occur when a metallic object (coin, clip or pen) causes direct connection of the + and - terminals of the battery (metal strips on the battery) for example when you carry a spare battery in your pocket or purse. Short-circuiting the terminals may damage the battery or the connecting object.

Leaving the battery in hot or cold places, such as in a closed car in summer or winter conditions, will reduce the capacity and lifetime of the battery. Always try to keep the battery between 15°C and 25°C (59°F and 77°F). A phone with a hot or cold battery may temporarily not work, even when the battery is fully charged. Batteries' performance is particularly limited in temperatures well below freezing.

Do not dispose of batteries in a fire!

Dispose of batteries according to local regulations (e.g. recycling). Do not dispose as household waste.

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Our policy is of continuous development; details of all technical modifications will be included with service bulletins.

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Nokia 2610 Service Manual Structure

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7 RF troubleshooting
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1 — General information

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Product selection

The RH-86 (Nokia 2610) is the EU/China version of the telephone with a dual band transceiver unit designed for the GSM900 and GSM1800 networks.

RH-87 (Nokia 2610) is the US version designed for the GSM850 and GSM1900 networks.

Figure 1 RH-86/87 product picture

Features

Phone features

Display and keypad

- 65,536-color display
- 4UI-style, 5-way navigation key including selection key
- Intuitive user interface with dedicated shortcut keys, Go-to-menu, Recently Used numbers, and quick access to WAP Browser with "0" key
- Ergonomic design with improved grip

Hardware features

- GSM E900/1800 (EMEA/APAC version) or GSM 850/1900 (US, Mexico, LTA)
- AMR/HR/FR/EFR codecs
- Internal antenna
- Charger plug
- Headset connector

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- Mono FM Radio
- GPRS: Class B, multislot class 6
- Internal vibrator
- SIM (1.8 and 3.0 V)

Software and User Interface features

Software features

- Nokia Series 40 User interface
- Douglas 4 platform

UI features

Messaging	• Nokia Xpress audio messaging • SMS, MMS, instant messaging, and email • Common inbox for MMS and text messages • Recently used list to access last used number in Message Editor
Connectivity	• Easy flash connector
Language support	Language support depends on location.
Games	• Coin Flipping
Voice features	• Voice recorder • Set voice clip as ringing tone • AMR audio specification for better audio quality • USSD & Cell Broadcast
Other phone features	• Power organizer – review by week or month with local calendar • Expense manager – manage your finances effectively • Converter II • Calculator Built-in hands-free speaker 300 contact entries in Phonebook

Mobile enhancements

Table 1 Power

Type	Name
BL-5C	Battery 970 mAh Li-Ion
AC-1	Retractable charger
ACP-12E/ACP-12X	Travel charger
LCH-12	Mobile charger

Table 2 Car

Type	Name
BHF-2	Headrest hands free

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Type	Name
CK-10	Nokia car kit
HF-8	Nokia plug-in car handsfreet
	Nokia universal holder

Table 3 Audio

Type	Name
HDB-5	Boom Headset
HDC-5	Headset
HS-7	Headset

Table 4 Carrying

Type	Name
CP-60	Carrying Case
CP-109	Universal Carrying Case
CP-110	Universal Carrying Case

Technical specifications

General specifications

Unit	Dimension (mm)	Weight (g)	Volume (cc)
Transceiver with BL-5C 970 mAh Li-Ion battery pack	104 x 43 x 18	91	70

Battery endurance

Talk time	
Battery: BL-5C 970 mAh	Up to 240 min

Standby time	
Battery: BL-5C 970 mAh	Up to 380 hours

Note: Variation in operation times will occur depending on SIM card, network settings and usage. Talk time is increased by up to 30% if half rate is active and reduced by 5% if enhanced full rate is active.

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Environmental conditions

Environmental condition	Ambient temperature	Notes
Normal operation	-15 ºC ... +55 ºC	Specifications fulfilled
Reduced performance	-30 ...15 ºC and +55ºC ... +70 ºC	Operational only for short periods
Intermittent or no operation	-40 ºC ... -30 ºC and +70 ºC ... +85ºC	Operation not guaranteed but an attempt to operate will not damage the phone
No operation or storage	<-40 ºC and >+85 ºC	No storage. An attempt to operate may cause permanent damage
Charging allowed	-15 ºC ... +55 ºC	
Long term storage conditions	0 ºC ... +85 ºC	
Humidity and water resistance		Relative humidity range is 5 to 95%. Condensed or dripping water may cause intermittent malfunctions. Protection against dripping water has to be implemented in (enclosure) mechanics. Continuous dampness will cause permanent damage to the module.

Electrical characteristics

Table 5 Normal and extreme voltages

Voltage	Voltage (V)	Condition
General conditions		
Nominal voltage	3.90V	a
Lower extreme voltage	3.30V	b
Higher extreme voltage	4.30V	c
HW shutdown voltages		
Vmstr+	2.1V ± 0,1V	Off to on
Vmstr-	1.9V ± 0,1V	On to off
SW shutdown voltages		
SW shutdown	3. 1V	In call
SW shutdown	3. 2V	In idle
Min operating voltage		
Vcoff+	3. 1V ± 0,1V	Off to on

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Vcoff-	2. 8V ± 0,1V	On to off
HW reset demands		
Min	1. 0V	d
Max	--	

a. The nominal voltage is defined as being 15% higher than the lower extreme voltage. TA will test with this nominal voltage at an 85% range (0.85x3.9V [a] 3.3V).

b. This limit is set to be above SW shutdown limit in TA.

c. During fast charging of an empty battery, this voltage might exceed this value. Voltages between 4.20 and 4.60 might appear for a short while.

d. The minimum battery cell voltage required for the reset circuitry to turn on. This is not confirmed by measures at pt.

Table 6 Current consumption

Condition	Min	Typical	Max	Unit
Call (MoU) GSM 850 (E)GSM 900 GSM 1800 GSM 1900		. 225 208 188 168		mA
Idle (MoU)		2.72		mA
Power off	25	30	45	µA

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2 — Parts and layouts

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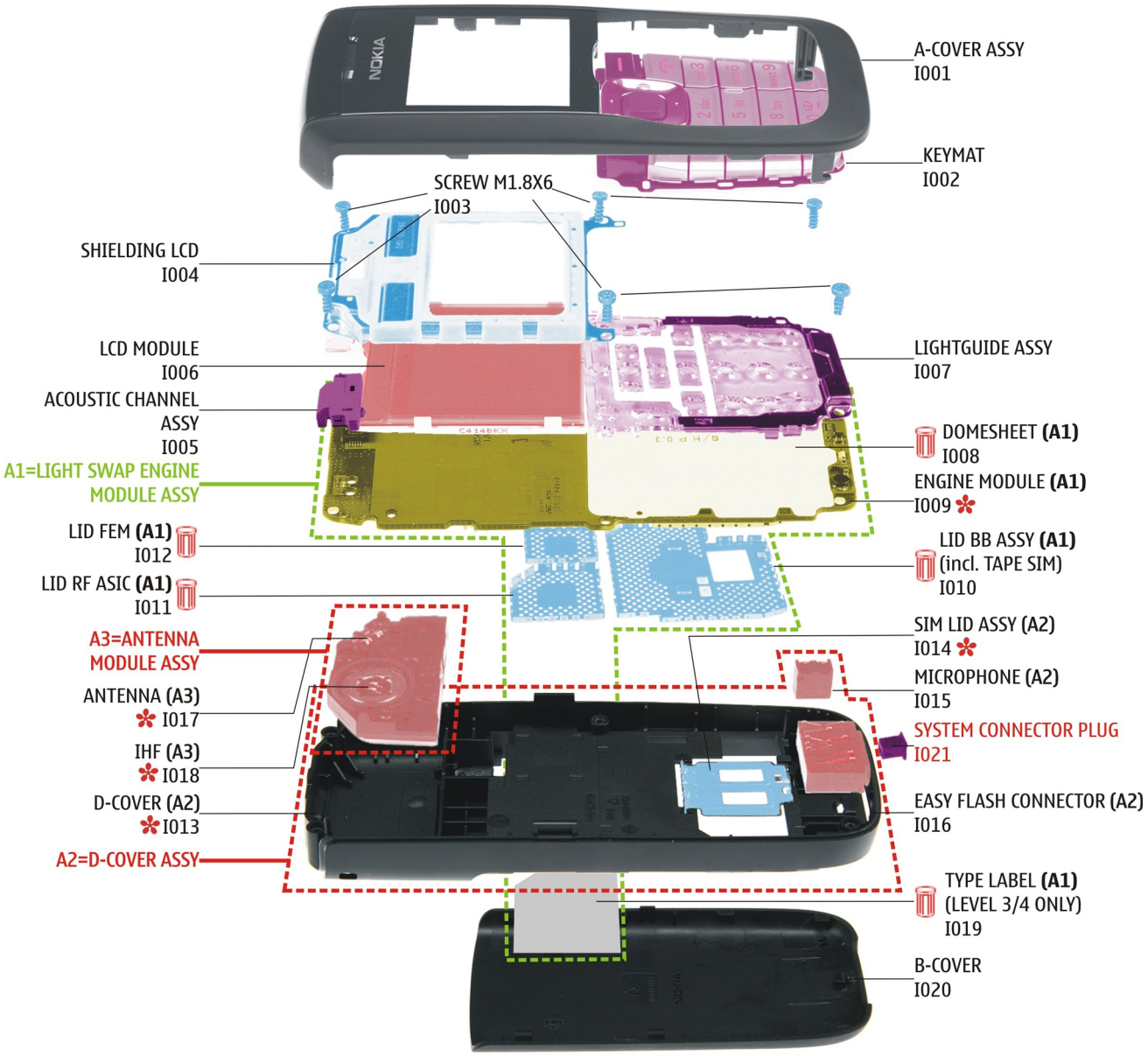
Exploded view



= These parts can not be reused after removal.

A1= LIGHT SWAP ENGINE MODULE
A2=D-COVER ASSY
A3= ANTENNA IHF ASSY

= ONLY AVAILABLE AS ASSEMBLY

Ver. 0.1

ELECTRO SILICONE METAL PLASTIC PWB COVER

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Mechanical parts list

Table 7 Mechanical spare parts

Item ref	Qty	Description	NAM	LTA	EMEA	APAC	China
* = Not available as spare part							
I001	1	A-COVER ASSY PAINT BLACK	X	X	X	X	X
I001	1	A-COVER ASSY PAINT BROWN	X		X	X	X
I001	1	A-COVER ASSY PAINT SILVER		X			
I001	1	A-COVER ASSY PAINT GREY	X		X	X	X
I001	1	A-COVER ASSY PAINT BLUE	X		X	X	X
I002	1	KEYMAT BLACK ASSY LATIN		X			
I002	1	KEYMAT ASSY STORKE				X	X
I002	1	KEYMAT ASSY BOPOMOFO				X	X
I002	1	KEYMAT ASSY LATIN	X	X	X	X	X
I003	6	Screw M1.8 X 6	X	X	X	X	X
I004	1	Shielding LCD	X	X	X	X	X
I005	1	Acoustics Channel Assy	X	X	X	X	X
I006	1	LCD Module	X	X	X	X	X
I007	1	Light Guide Assy	X	X	X	X	X
I008	1	Domesheet	X	X	X	X	X
A1*	1	Light swap Engine module RH-86	X	X	X	X	X
A1*	1	Light swap Engine module RH-87	X	X	X	X	X
I008	1	Domesheet	X	X	X	X	X
I009*	1	Engine module	X	X	X	X	X
I010	1	Lid BB Assy	X	X	X	X	X
I011	1	Lid RF ASIC	X	X	X	X	X
I012	1	Lid FEM	X	X	X	X	X
I019	1	Blank Label 30.5 x 20	X	X	X	X	X
A2	1	D-COVER ASSY	X	X	X	X	X
I013*	1	D-Cover					
I014*	1	SIM lid assy					
I015	1	Microphone	X	X	X	X	X
I016	1	CONN SYST TWIN JACK+FLASH CONN/4P	X	X	X	X	X
A3	1	Antenna Module SAM P2906 EU		X	X	X	X

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Item ref	Qty	Description	NAM	LTA	EMEA	APAC	China
A3		Antenna Module SAM P2906 US	X				
I017*	1	Antenna	X	X	X	X	X
I018*	1	IHF	X	X	X	X	X
I020	1	B-Cover Paint Black	X	X	X	X	X
I020	1	B-Cover Paint GREY	X		X	X	X
I020	1	B-Cover Paint BLUE	X		X	X	X
I020	1	B-Cover Paint BROWN	X		X	X	X
I020	1	B-Cover Paint SILVER		X			
I021	1	Easy Flash Cap/System connector plug	X	X	X	X	X

SWAP units

Table 8 SWAP units

SWAP units
RH-86 light swap package EU AE
RH-86 light swap package EU FRANCE
RH-86 light swap package EU UKRAINE
RH-86 light swap package EU RUSSIA
RH-86 light swap package EU S-AFRICA
RH-86 light swap package EU TURKEY
RH-86 light swap package APAC GENERIC
RH-86 light swap package APAC PHILIPPINES
RH-86 light swap package LTA GENERIC
RH-87 light swap package LTA GENERIC

Components parts list

Table 9 Changeable components

Item ref	Side	XY		Description	NAM	LTA	EMEA	APAC	China
B2200	T	O	7	CRYSTAL 32.768KHZ+-20PPM 12.5PF	X	X		X	X
B7600	T	K	5	CRYSTAL 26MHZ+-10PPM 15.5PF	X	X		X	X
C2000	T	G	3	Chipcap 5% NP0	X	X		X	X
C2001	T	G	2	Chipcap 5% NP0	X	X		X	X
C2002	T	G	4	CHIPTCAP 150U M 10V 6X3.2X1.5	X	X		X	X
C2003	T	S	5	Chipcap 5% NP0	X	X		X	X
C2004	T	R	5	Chipcap 5% NP0	X	X		X	X
C2005	T	R	5	Chipcap 5% NP0	X	X		X	X

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Item ref	Side	XY		Description	NAM	LTA	EMEA	APAC	China
C2006	T	R	5	Chipcap 5% NP0	X	X		X	X
C2007	T	S	7	CHIPCAP X5R 470N K 25V 0603	X	X		X	X
C2008	T	R	4	Chipcap X7R 10% 16V 0402	X	X		X	X
C2009	T	R	4	Chipcap X7R 10% 16V 0402	X	X		X	X
C2010	T	R	5	Chipcap X7R 10% 16V 0402	X	X		X	X
C2011	T	S	3	CHIPCAP X5R 1U K 6V3 0603	X	X		X	X
C2012	T	R	4	Chipcap X7R 10% 16V 0402	X	X		X	X
C2013	T	R	3	Chipcap X7R 10% 50V 0402	X	X		X	X
C2017	T	G	5	Chipcap 5% NP0	X	X		X	X
C2151	T	N	7	CHIP ARRAY X5R 2X33N K 10V 0405	X	X		X	X
C2152	T	S	3	Chipcap 5% NP0	X	X		X	X
C2153	B	B	6	Chipcap 5% NP0	X	X		X	X
C2154	B	B	7	Chipcap 5% NP0	X	X		X	X
C2155	T	N	6	CHIP ARRAY X5R 2X33N K 10V 0405	X	X		X	X
C2157	T	O	8	Chipcap 5% NP0	X	X		X	X
C2159	T	N	7	CHIPCAP X7R 15N K 16V 0402	X	X		X	X
C2161	T	N	8	CHIPCAP X5R 100N M 16V 0402	X	X		X	X
C2164	T	N	6	CHIP ARRAY NP0 2X27P K 25V 0405	X	X		X	X
C2165	T	N	7	CHIP ARRAY X5R 2X1N K 16V 0405	X	X		X	X
C2171	T	N	8	CHIPCAP X5R 2U2 K 6V3 0603	X	X		X	X
C2180	T	N	7	CHIPCAP X7R 15N K 16V 0402	X	X		X	X
C2181	T	M	7	CHIPCAP X5R 100N K 10V 0402	X	X		X	X
C2182	T	M	7	CHIPCAP X5R 1U K 6V3 0603	X	X		X	X
C2200	T	O	7	CHIPCAP X5R 1U K 6V3 0603	X	X		X	X
C2202	T	O	7	CHIPCAP X5R 1U K 6V3 0603	X	X		X	X
C2203	T	O	7	CHIPCAP X5R 1U K 6V3 0603	X	X		X	X
C2204	T	P	5	CHIPCAP X5R 1U K 6V3 0603	X	X		X	X
C2205	T	P	5	CHIPCAP X5R 1U K 6V3 0603	X	X		X	X
C2208	T	P	4	CHIPCAP X5R 1U K 6V3 0603	X	X		X	X
C2220	T	M	7	Chipcap X7R 10% 16V 0402	X	X		X	X
C2222	T	P	7	CHIPCAP X5R 1U K 6V3 0603	X	X		X	X
C2223	T	O	7	CHIPCAP X5R 1U K 6V3 0603	X	X		X	X
C2225	T	M	6	CHIPCAP X5R 1U K 6V3 0603	X	X		X	X
C2226	T	P	7	CHIPCAP X5R 1U K 6V3 0603	X	X		X	X
C2227	T	M	6	CHIPCAP X5R 1U K 6V3 0603	X	X		X	X

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Item ref	Side	XY		Description	NAM	LTA	EMEA	APAC	China
C2230	T	O	7	CHIPCAP X5R 1U K 6V3 0603	X	X		X	X
C2233	T	O	7	CHIPCAP X5R 1U K 6V3 0603	X	X		X	X
C2235	T	M	7	CHIPCAP X5R 1U K 6V3 0603	X	X		X	X
C2236	T	M	5	CHIPCAP X5R 100N K 10V 0402	X	X		X	X
C2237	T	M	5	CHIPCAP X5R 100N K 10V 0402	X	X		X	X
C2239	T	P	5	CHIPCAP X5R 100N K 10V 0402	X	X		X	X
C2240	T	M	6	Chipcap X7R 10% 16V 0402	X	X		X	X
C2241	T	M	6	Chipcap X7R 10% 50V 0402	X	X		X	X
C2242	T	M	6	Chipcap X7R 10% 50V 0402	X	X		X	X
C2261	T	P	6	CHIPCAP X5R 4U7 K 10V 0805	X	X		X	X
C2263	T	R	8	CHIPCAP X5R 100N K 10V 0402	X	X		X	X
C2287	T	M	5	CHIPCAP X5R 100N K 10V 0402	X	X		X	X
C2330	T	G	2	Chipcap 5% NP0	X	X		X	X
C2331	T	P	5	CHIPCAP X5R 1U K 6V3 0603	X	X		X	X
C2332	T	P	5	CHIPCAP X5R 4U7 K 10V 0805	X	X		X	X
C2400	B	U	4	CHIPCAP X5R 1U K 16V 0603	X	X		X	X
C2401	B	U	5	CHIPCAP X5R 1U K 6V3 0603	X	X		X	X
C2402	B	C	2	CHIPCAP X5R 100N K 10V 0402	X	X		X	X
C2403	B	C	2	CHIPCAP X5R 100N K 10V 0402	X	X		X	X
C2405	T	P	5	Chipcap 5% NP0	X	X		X	X
C2700	T	R	4	CHIPCAP X5R 100N K 10V 0402	X	X		X	X
C2880	T	O	4	Chipcap X7R 10% 16V 0402	X	X		X	X
C2881	T	P	3	CHIPCAP X5R 100N K 10V 0402	X	X		X	X
C2882	T	P	3	Chipcap X7R 10% 16V 0402	X	X		X	X
C2883	T	O	2	Chipcap X7R 10% 16V 0402	X	X		X	X
C2884	T	O	2	CHIPCAP X5R 100N K 10V 0402	X	X		X	X
C2885	T	P	3	Chipcap X7R 10% 16V 0402	X	X		X	X
C2886	T	P	3	CHIPCAP X5R 100N K 10V 0402	X	X		X	X
C2887	T	O	2	Chipcap X7R 10% 16V 0402	X	X		X	X
C2900	T	K	7	Chipcap X7R 10% 50V 0402	X	X		X	X
C3030	T	M	2	Chipcap X7R 10% 16V 0402	X	X		X	X
C3031	T	M	2	CHIPCAP X5R 100N K 10V 0402	X	X		X	X
C3032	T	M	2	CHIPCAP X5R 100N M 16V 0402	X	X		X	X
C7604	T	I	6	CHIPCAP NP0 0P5 C 50V 0402	X	X		X	X
C7606	T	H	7	Chipres 0W06 jumper 0402		X		X	X

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Item ref	Side	XY		Description	NAM	LTA	EMEA	APAC	China
C7606				Chipcap +-0.25pF NP0	X				
C7607	T	I	7	Chipcap +-0.25pF NP0	X	X		X	X
C7610	T	I	8	Chipcap 5% NP0	X	X		X	X
C7611	T	I	7	Chipcap 5% NP0	X	X		X	X
C7612	T	I	7	Chipcap 5% NP0	X	X		X	X
C7613	T	I	7	CHIPCAP X5R 1U K 6V3 0402	X	X		X	X
C7614	T	J	7	Chipcap +-0.25pF NP0	X	X		X	X
C7615				CHIP COIL 12N J Q31/800M 0402	X				
C7620	T	K	7	CHIPCAP X5R 2U2 K 6V3 0603	X	X		X	X
C7623	T	J	7	Chipcap 5% NP0	X	X		X	X
C7624	T	J	8	CHIPCAP X5R 100N K 10V 0402	X	X		X	X
C7625	T	J	6	Chipcap 5% NP0	X	X		X	X
C7627	T	J	5	Chipcap 5% NP0	X	X		X	X
C7628	T	J	5	Chipcap 5% NP0	X	X		X	X
C7630	T	K	6	Chipcap 5% NP0	X	X		X	X
C7634	T	I	7	CHIPCAP X5R 100N K 10V 0402	X	X		X	X
C7635	T	K	6	CHIPCAP X5R 100N K 10V 0402	X	X		X	X
C7636	T	K	6	Chipcap +-0.25pF NP0	X	X		X	X
C7637	T	K	2	Chipcap 5% X7R	X	X		X	X
C7638	T	K	2	Chipcap 5% NP0	X	X		X	X
C7639	T	J	7	CHIPCAP NP0 270P J 25V 0402	X	X		X	X
C7641	T	J	7	CHIPCAP NP0 270P J 25V 0402	X	X		X	X
C7643	T	K	6	CHIPCAP X5R 100N K 10V 0402	X	X		X	X
C7644	T	J	7	Chipcap 5% X7R	X	X		X	X
C7645	T	I	7	Chipcap 5% X7R	X	X		X	X
C7655	T	I	5	Chipcap 5% NP0	X	X		X	X
C7656	T	J	5	CHIPCAP X5R 100N K 10V 0402	X	X		X	X
C7657	T	K	7	Chipcap 5% NP0	X	X		X	X
C7658	T	J	7	Chipcap 5% NP0	X	X		X	X
C7659	T	I	6	Chipcap 5% NP0	X	X		X	X
C7668	T	I	6	Chipcap 5% NP0	X	X		X	X
C7669	T	K	8	CHIPCAP NP0 3N9 J 25V 0805	X	X		X	X
C7700	T	K	3	Chipcap 5% NP0	X	X		X	X
C7701	T	K	3	Chipcap 5% NP0	X	X		X	X
C7702	T	K	4	Chipcap 5% NP0	X	X		X	X

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Item ref	Side	XY		Description	NAM	LTA	EMEA	APAC	China
C7711	T	I	2	CHIPCAP X5R 2U2 K 10V 0805	X	X		X	X
C7712	T	I	4	Chipcap +-0.25pF NP0		X		X	X
C7712				Chipcap 5% NP0	X				
C7713	T	I	2	Chipcap 5% NP0	X	X		X	X
C7714	T	K	3	Chipcap 5% NP0	X	X		X	X
C7720	T	K	4	Chipcap 5% NP0	X	X		X	X
C7725	T	K	3	Chipcap 5% NP0	X	X		X	X
C7726	T	J	2	Chipcap 5% NP0	X	X		X	X
C7727	T	K	2	Chipcap 5% NP0	X	X		X	X
C7728	T	K	2	CHIPCAP NP0 0P5 C 50V 0402	X	X		X	X
D2200	T	O	5	UEMCLITE V3.0 WD ENA LEADFREE TFBGA120	X	X		X	X
D2800	T	O	3	UPP4M V4.3 PROTO KFAB 10X10 UBGA173	X	X		X	X
D3000	T	M	3	COMBO 128M NOR + 16M PSRAM FBGA44 PBFREE	X	X		X	X
F2000	T	T	7	SM FUSE FF 2A 32V 0402	X	X	X	X	X
H2400	B	C	3	SM CONN BTB 2X5 F P0.5	X	X	X	X	X
L2000	T	T	7	FERR.BEAD 0R03 42R/100MHZ 3A 0805	X	X		X	X
L2001	T	R	3	CHIP BEAD ARRAY 2X1000R 0405	X	X		X	X
L2002	T	R	4	CHIP BEAD ARRAY 2X1000R 0405	X	X		X	X
L2170	T	S	3	FERRITE BEAD 0R5 600R/100MHZ 0603	X	X		X	X
L2180	T	M	7	FERR.BEAD 220R/100M 2A 0R05 0603	X	X		X	X
L2181	T	M	7	FERR.BEAD 220R/100M 2A 0R05 0603	X	X		X	X
L2182	B	B	6	CHIP COIL 33N J Q23/800M 0402	X	X		X	X
L2183	B	B	6	CHIP COIL 33N J Q23/800M 0402	X	X		X	X
L2400	B	U	6	CHOKE 22U M 1R5 0.35A	X	X		X	X
L7602	T	I	7	CHIP COIL 10N J Q30/800M 0402	X	X		X	X
L7603	T	I	7	CHIP COIL 10N J Q30/800M 0402	X	X		X	X
L7604	T	I	6	CHIP COIL 1N8+-0N3 Q31/800M 0402	X	X		X	X
L7605	T	I	6	CHIP COIL 1N8+-0N3 Q31/800M 0402	X	X		X	X
L7607	T	H	6	Chipres 0W06 jumper 0402	X	X		X	X
M2000	T	G	6	SMD VIBRA MOTOR 1.3V 80MA 9000RPM	X	X	X	X	X
N2150	T	M	7	PW AMP TPA2010D1YZF 250KHZ CSP9	X	X		X	X
N2160	T	L	7	IC ANALOG SWITCH SPST TS5A23166 VSSOP8	X	X		X	X
N2400	B	T	6	DC/DC CONV LM3500/ TK65600 USMD8	X	X		X	X
N7600	T	J	7	HUGIN + PMB3258V1.1 B9C PGVGFN48-4/-6	X	X		X	X

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Item ref	Side	XY		Description	NAM	LTA	EMEA	APAC	China
N7700	T	J	3	FEM PF88112BS_12WS0 2B-TX 2B-RX	X				
N7700				FEM PF88112BS_12WS0 2B-TX 2B-RX		X		X	X
R2000	T	G	3	CHIP VARISTOR VWM5.6V VC15.5 0402	X	X		X	X
R2001	T	R	3	NTC RES 47K J B=4050+-3% 0402	X	X		X	X
R2002	T	R	5	Resistor 5% 63mW	X	X		X	X
R2003	T	R	5	Resistor 5% 63mW	X	X		X	X
R2004	T	R	5	Resistor 5% 63mW	X	X		X	X
R2005	T	S	5	Resistor 5% 63mW	X	X		X	X
R2006	T	R	5	RES VARISTOR 14/350V 3PF 0402	X	X		X	X
R2007	T	R	4	CHIP VARISTOR VWM14V VC50V 0402	X	X		X	X
R2008	T	S	4	CHIP VARISTOR VWM14V VC50V 0402	X	X		X	X
R2009	T	R	4	CHIP VARISTOR VWM14V VC50V 0402	X	X		X	X
R2010	T	S	3	Resistor 5% 63mW	X	X		X	X
R2011	T	R	4	RES NETWORK 0W06 2X10R J 0404	X	X		X	X
R2013	T	R	5	CHIP VARISTOR VWM5.6V VC15.5 0402	X	X		X	X
R2020	T	R	5	ASIP TVS 4-CH BI ESD 14V 15PF 400UM BGA5	X	X		X	X
R2027	T	R	5	Resistor 5% 63mW	X	X		X	X
R2030	T	M	4	Chipres 0W06 jumper 0402	X	X		X	X
R2068	T	R	2	RES NETWORK 0W03 4X22R J 0804	X	X		X	X
R2069	T	S	2	Resistor 5% 63mW	X	X		X	X
R2070	T	S	2	CHIP VARISTOR VWM5.6V VC15.5 0402	X	X		X	X
R2150	T	N	7	RES NETWORK 0W06 2X1K0 J 0404	X	X		X	X
R2151	T	L	7	Resistor 5% 63mW	X	X		X	X
R2152	T	N	7	Resistor 5% 63mW	X	X		X	X
R2153	T	N	7	RES NETWORK 0W06 2X2K2 J 0404	X	X		X	X
R2154	T	N	7	RES NETWORK 0W06 2X2K2 J 0404	X	X		X	X
R2155	T	L	6	Resistor 5% 63mW	X	X		X	X
R2156	T	O	7	Resistor 5% 63mW	X	X		X	X
R2158	T	N	7	Resistor 5% 63mW	X	X		X	X
R2159	T	N	7	Resistor 5% 63mW	X	X		X	X
R2160	T	L	6	Resistor 5% 63mW	X	X		X	X
R2171	T	N	8	Resistor 5% 63mW	X	X		X	X
R2200	T	P	6	CHIPRES 0W25 0R22 J 0805	X	X		X	X
R2202	T	M	7	Resistor 5% 63mW	X	X		X	X
R2203	T	M	7	Resistor 5% 63mW	X	X		X	X

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Item ref	Side	XY		Description	NAM	LTA	EMEA	APAC	China
R2204	T	M	6	Resistor 5% 63mW	X	X		X	X
R2205	T	M	6	RES NETWORK 0W06 2X10K J 0404	X	X		X	X
R2206	T	M	7	Resistor 5% 63mW	X	X		X	X
R2207	T	L	4	Resistor 5% 63mW	X	X		X	X
R2400	B	U	5	Resistor 5% 63mW	X	X		X	X
R2401	B	U	6	CHIPRES 0W06 4R3 J 0402	X	X		X	X
R2406	T	O	2	Resistor 5% 63mW	X	X		X	X
R2407	T	P	2	Resistor 5% 63mW	X	X		X	X
R2408	T	P	2	Resistor 5% 63mW	X	X		X	X
R2409	B	T	4	Resistor 5% 63mW	X	X		X	X
R2700	T	P	4	ASIP SIM ESD/EMI FILT 400UM BGA8	X	X		X	X
R2900	T	K	7	Resistor 5% 63mW	X	X		X	X
R3030	T	M	2	Resistor 5% 63mW	X	X		X	X
R7605	T	K	7	Resistor 5% 63mW	X	X		X	X
R7609	T	K	6	Resistor 1% 63mW	X	X		X	X
R7610	T	M	5	RES NETWORK 0W06 2X5K6 J 0404	X	X		X	X
R7611	T	M	5	RES NETWORK 0W06 2X5K6 J 0404	X	X		X	X
R7615	T	H	8	Resistor 5% 63mW	X	X		X	X
R7616	T	H	7	Resistor 5% 63mW	X	X		X	X
R7617	T	H	7	Resistor 5% 63mW	X	X		X	X
R7619	T	J	8	Resistor 5% 63mW	X	X		X	X
R7630	T	K	6	Resistor 5% 63mW	X	X		X	X
R7631	T	K	7	Resistor 5% 63mW	X	X		X	X
R7632	T	K	6	Resistor 5% 63mW	X	X		X	X
R7633	T	K	2	NTC RES 47K J B=4050+-3% 0402	X	X		X	X
R7635	T	K	2	Resistor 5% 63mW	X	X		X	X
R7663	T	K	8	Resistor 5% 63mW	X	X		X	X
R7700	T	I	5	Resistor 5% 63mW	X	X		X	X
R7701	T	I	5	Resistor 5% 63mW	X	X		X	X
R7703	T	J	5	Chipres 0W06 jumper 0402	X	X		X	X
R7704	T	K	3	Resistor 5% 63mW	X	X		X	X
R7705	T	K	3	Resistor 5% 63mW	X	X		X	X
R7706	T	K	3	Resistor 5% 63mW	X	X		X	X
R7707	T	I	5	Resistor 5% 63mW	X	X		X	X
R7709	T	I	5	Chipres 0W06 jumper 0402	X	X		X	X

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Item ref	Side	XY		Description	NAM	LTA	EMEA	APAC	China
R7710	T	J	4	Chipres 0W06 jumper 0402	X	X		X	X
R7711	T	J	4	RES NETWORK 0W04 1DB ATT 0404	X	X		X	X
R7714	T	J	2	RES NETWORK 0W04 1DB ATT 0404	X	X		X	X
R7720	T	K	4	Resistor 5% 63mW	X	X		X	X
R7732	T	K	2	Resistor 5% 63mW	X	X		X	X
R7733	T	K	2	Resistor 5% 63mW	X	X		X	X
V2000	T	S	7	ASIP TVS BGA4	X	X		X	X
V2160	T	L	6	TR PDTC114EE N 50V RB=RBE=10K EM3	X	X		X	X
V2400	B	U	5	LED WHITE 90-335MCD 15MA 0DEG 1608	X	X	X	X	X
V2401	B	U	3	TR PDTA114EE RB=RBE=10K 50V SC75	X	X		X	X
V7600	T	K	6	DI CAP 40/15.8PF 1/3V SCD80	X	X		X	X
X2005	T	G	3	SM LYNX BATT.CONN 3POL 12V 2A H7	X	X	X	X	X
X2060	B	T	3	MODULE ID COMPONENT 2.8X1.8X0.3					
X2700	T	Q	4	SM SIM CONN 6POL P2.54 H1.8	X	X	X	X	X
Z2400	T	Q	3	ASIP 10-CH LCD FILTER W/ESD BGA24	X	X		X	X
Z7600	T	H	6	SAW 1842.5+-37.5MHZ 2.0X1.6		X		X	X
Z7600				SAW 1842.5+-37.5MHZ 2.0X1.6	X				
Z7602	T	H	7	SAW 942.5+-17.5MHZ 2.0X1.6	X				
Z7602				SAW 942.5+-17.5MHZ 2.0X1.6		X		X	X
Z7603	T	J	5	SILICON FILT 869.5+-45.5MHZ P-TSLP-7-4	X	X		X	X
Z7604	T	J	5	SILICON FILT 1810+-100MHZ P-TSLP-7-4	X	X		X	X

Component layouts

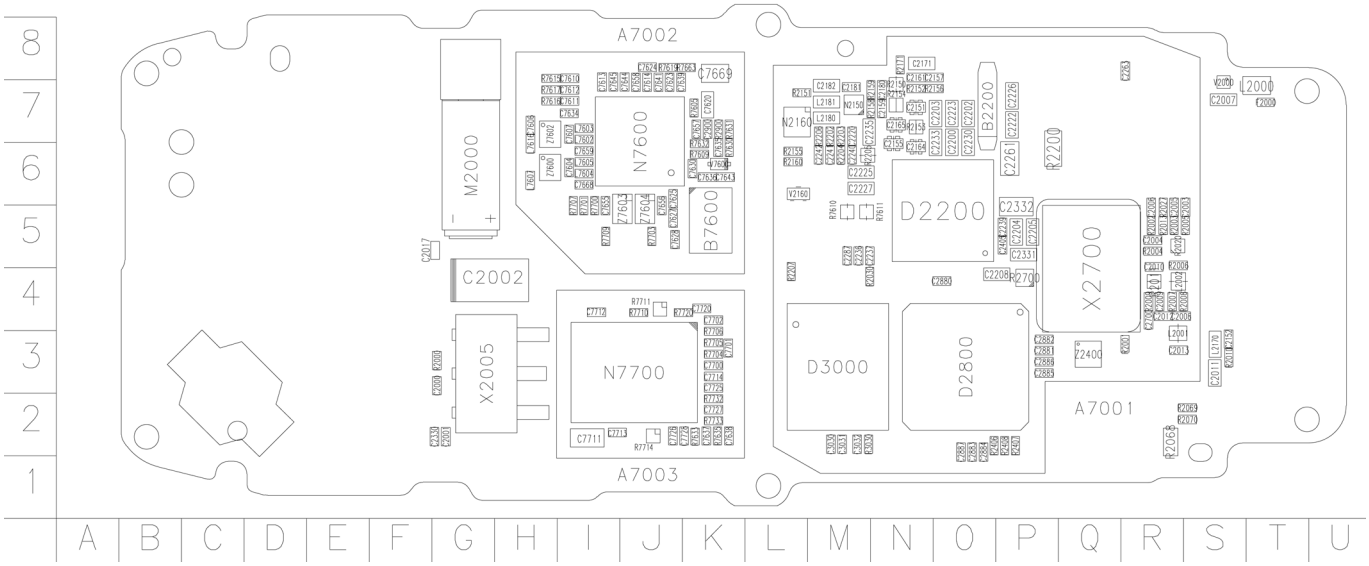

Figure 2 Component layout, top side (1jv_30a)

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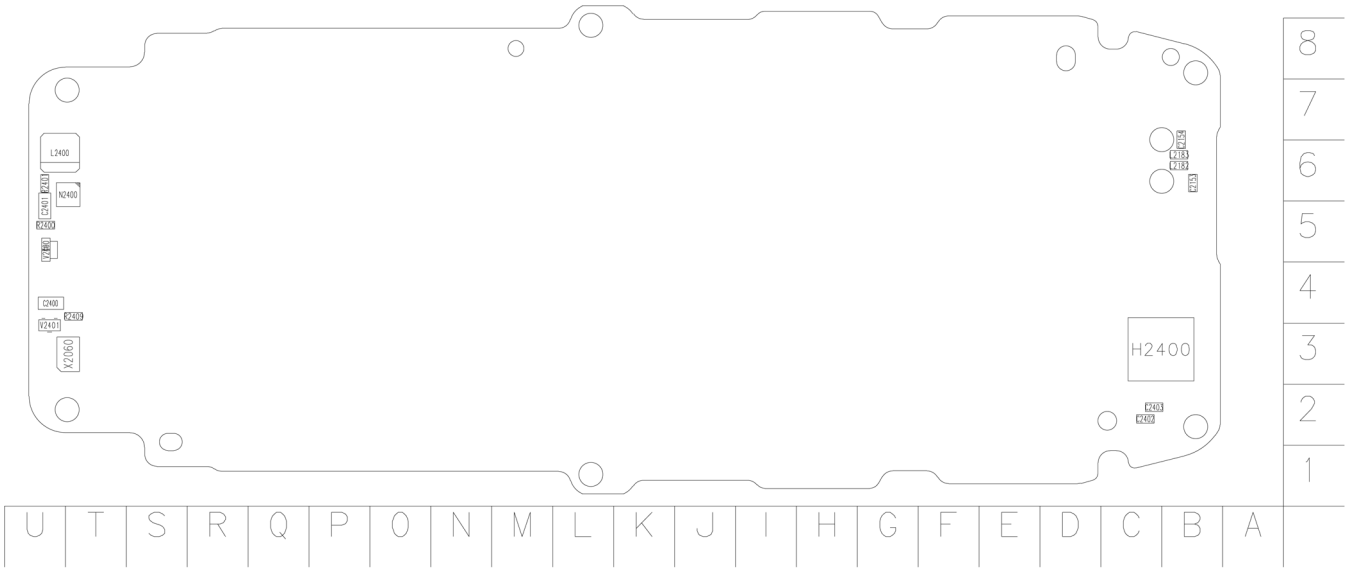

Figure 3 Component layout, bottom side (1jv_30a)

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3 — Phoenix service SW

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Introduction

Read this first

The Phoenix software is used to a number of different phones containing different versions of baseband generations.

These instructions are intended as a general guide and are not product specific, where a Phoenix SW version is shown you should use the relevant version for your product and in the screen shots where a type designator is shown you should read the type designator for your product.

Service software installation

Phoenix installation steps in brief

Phoenix is the DCT-4 generation service software for reprogramming, testing and tuning the phone.

To install Phoenix, you need to:

- Connect a DK2 Dongle or FLS-4S POS Flash Device
- Install the Phoenix Service SW
- Install the Data Package for Phoenix
- Configure users
- Manage connection settings (depends on the tools you are using)

Phoenix is now ready for FLS-4S Point Of Sales Flash Device use.

If you use FPS-8:

- Update FPS-8 SW
- Activate FPS-8
- Update JBV-1 Docking Station SW (only when needed)

Phoenix is now ready to be used with FPS-8 flash prommer and other tools as well.

The Phoenix Service Software installation contains:

- Service software support for all phone models included in the package
- Flash update package files for FPS-8* and FLS-4S programming devices
- All needed drivers for:
  - DK2 dongle
  - FLS-4S point of sales flash device
  - USB devices

Note: Separate installation packages for flash update files and drivers are also available, but it is not necessary to use them unless updates appear between Phoenix Service SW releases. If separate update packages are used, they should be used after Phoenix and data packages have been installed.

Supported operating systems

- Windows 2000 and XP.

Hardware requirements for using Phoenix

- Minimum: Processor 300 MHz, RAM memory 64 MB, disk space 100 MB.
- Recommended for Windows 2000: Processor 700 MHz, RAM memory 256 MB, disk space 150 MB.

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Installing Phoenix

Prerequisites

- Check that a Dongle is attached to the parallel port of your computer.
- Download the installation package (for example, *phoenix_service_sw_a15_2004_24_7_55.exe*) to your computer (in *C:|TEMP*, for instance).
- Close all other programs.
- Run the application file (for example, *phoenix_service_sw_a15_2004_24_7_55.exe*) and follow the instructions on the screen.

  Note: Administrator rights may be required to be able to install Phoenix depending on the operating system.

If uninstalling or rebooting is needed at any point, you will be prompted by the Install Shield program.

Context

If at any point during installation you get this message, Dongle is not found and installation cannot continue:

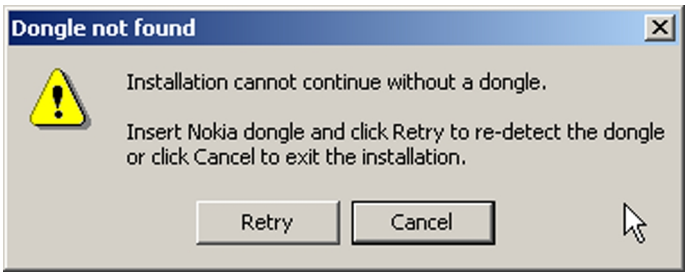

Figure 4 Dongle not found

Possible reasons may be a defective or too old PKD-1 Dongle (a new dongle has a six digit serial number).

Check the COM/parallel ports used first! After correcting the problem the installation can be restarted.

For more detailed information, please refer to Phoenix Help files. Each feature in Phoenix has its own Help function, which can be activated while running the program. Press the **F1** key or the **Help** button to activate a Help file.

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Steps

1. Run the *phoenix_service_sw_a15_2004_24_7_55.exe* to start installation. Install Shield prepared the setup.

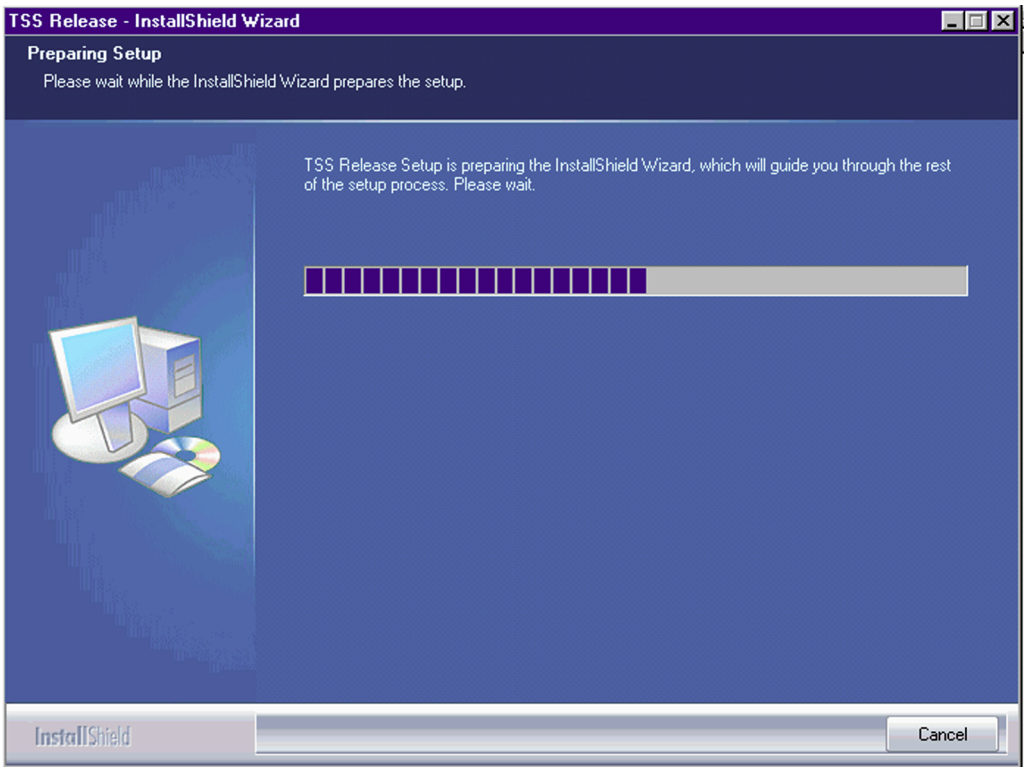

Figure 5 Preparing setup

Install Shield will prepare.

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2. Click **Next** in Welcome dialog to continue.

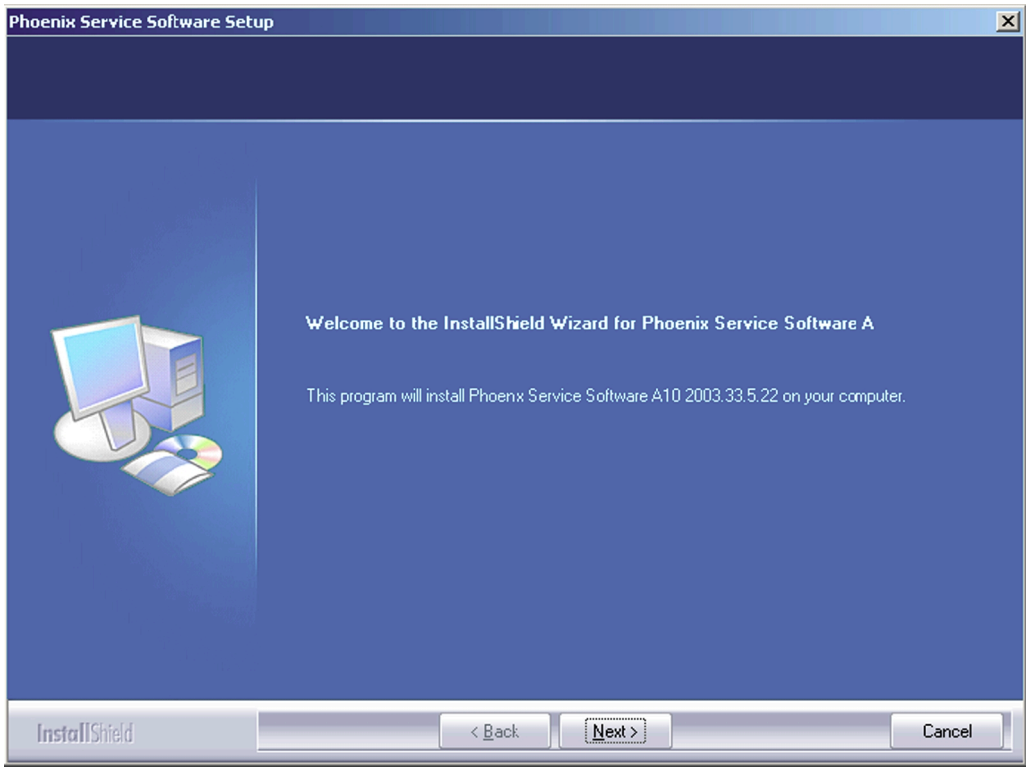

Figure 6 Welcome dialog

3. Read the disclaimer carefully.

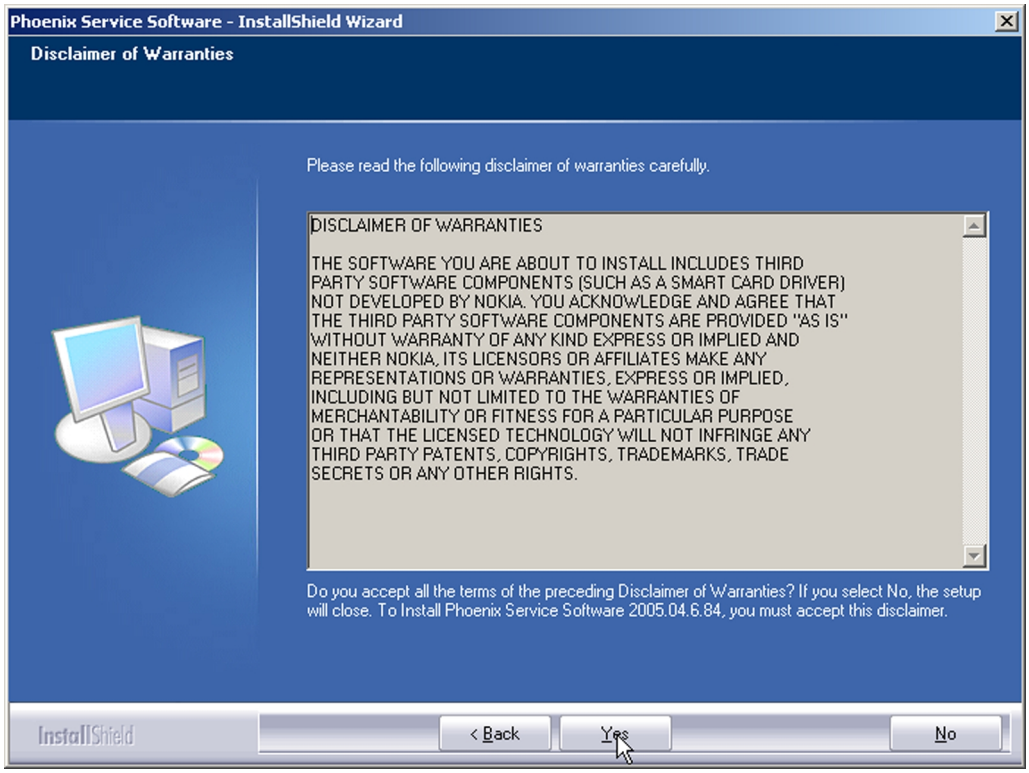

Figure 7 Disclaimer text

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4. Choose destination folder. The default folder *C:|ProgramFiles|Nokia|Phoenix* is recommended. Then click **Next** to continue. You may choose another location by selecting **Browse** (not recommended).

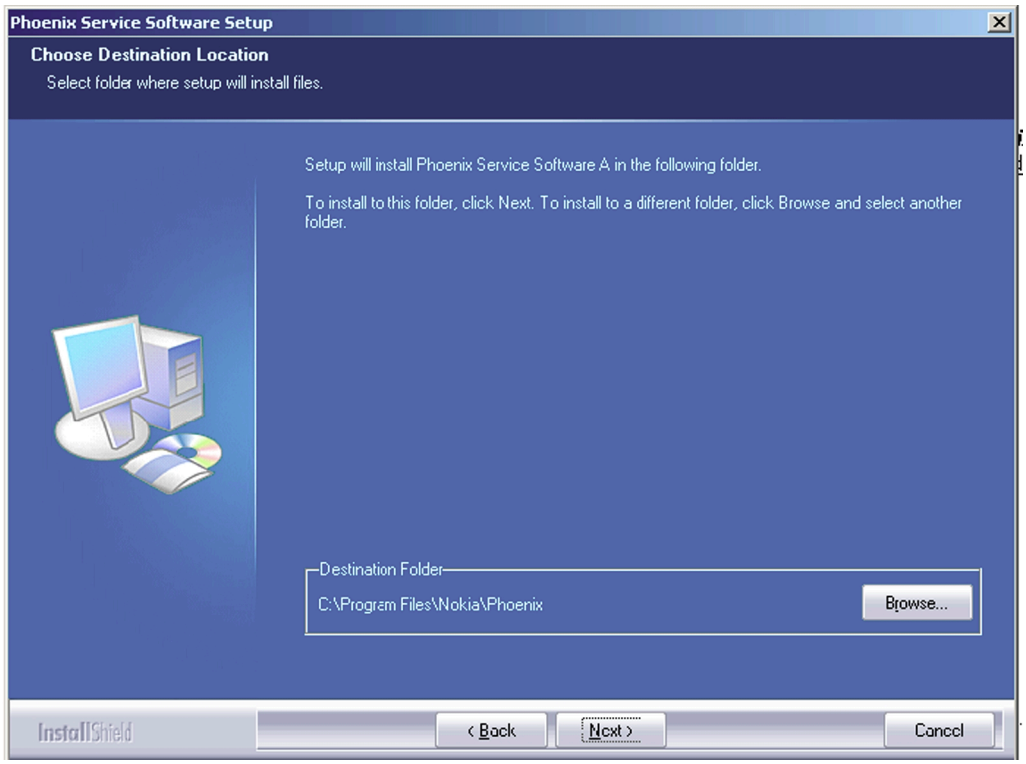

Figure 8 Destination folder

5. Wait for the components to be copied. The progress of the setup is shown in the *Setup Status* window.

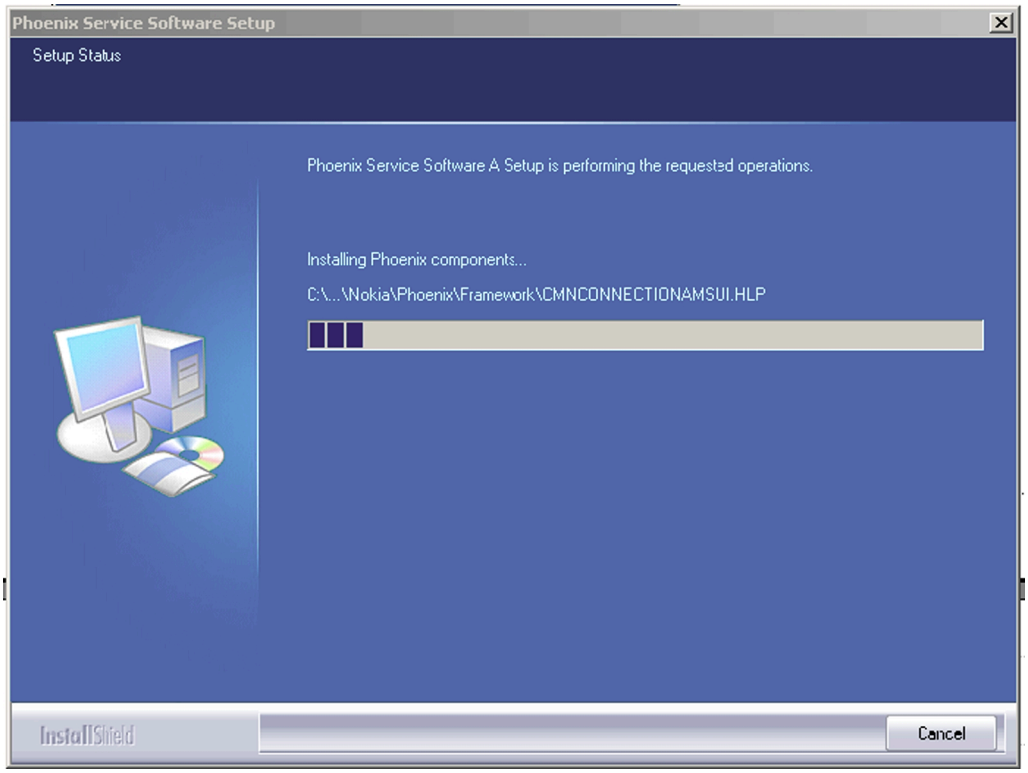

Figure 9 Installation status 1

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6. Wait for the drivers to be installed and updated.

   The process may take several minutes to complete.

   If the operating system does not require rebooting (Windows 2000, XP) the PC components are registered right away.

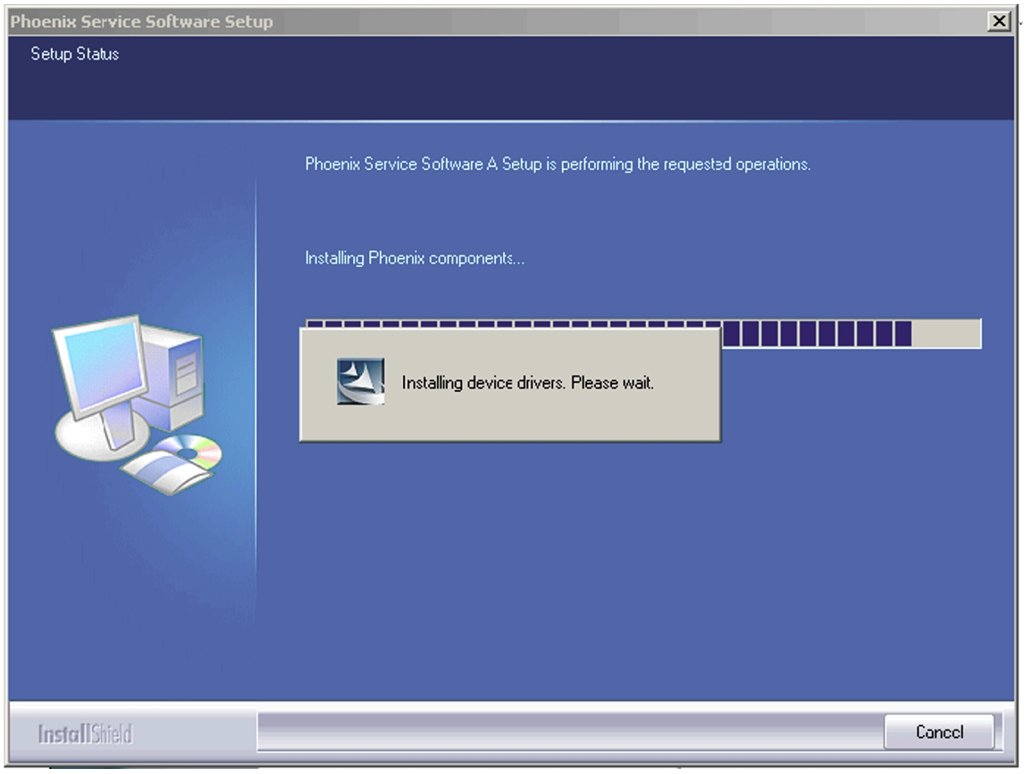

Figure 10 Installation status 2

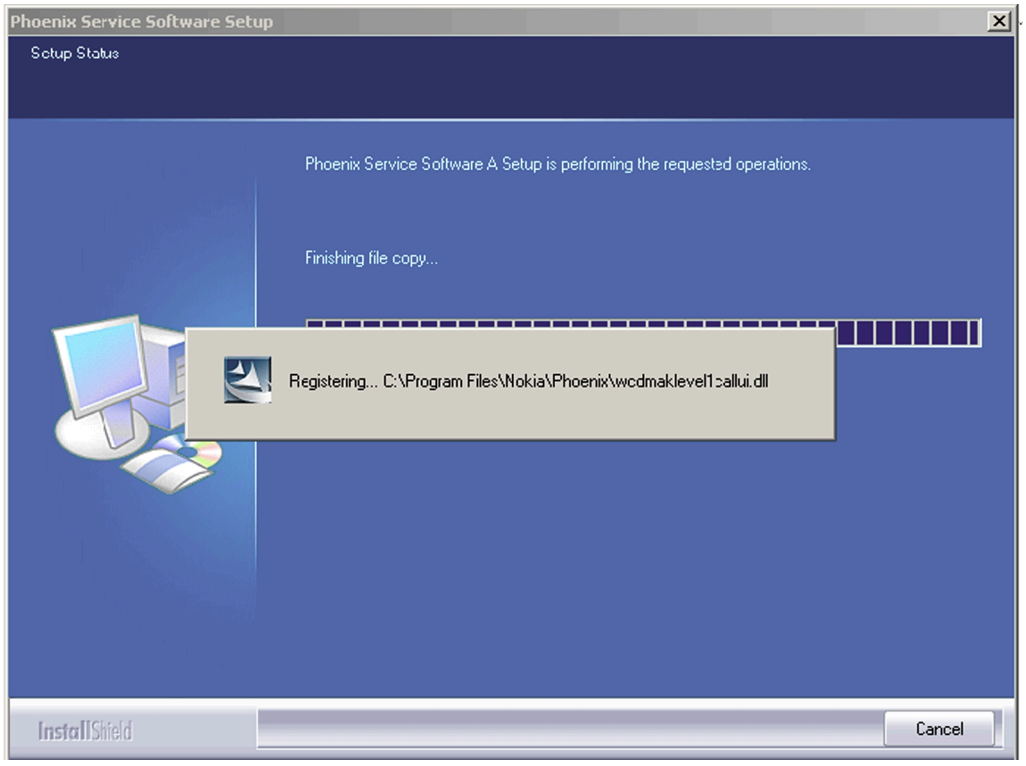

Figure 11 Registering components 1

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If the operating system requires restarting your computer (Windows 98, SE, ME) the Install Shield Wizard will tell you about it. Select **Yes...** to reboot the PC immediately and **No...** to reboot the PC manually afterwards.

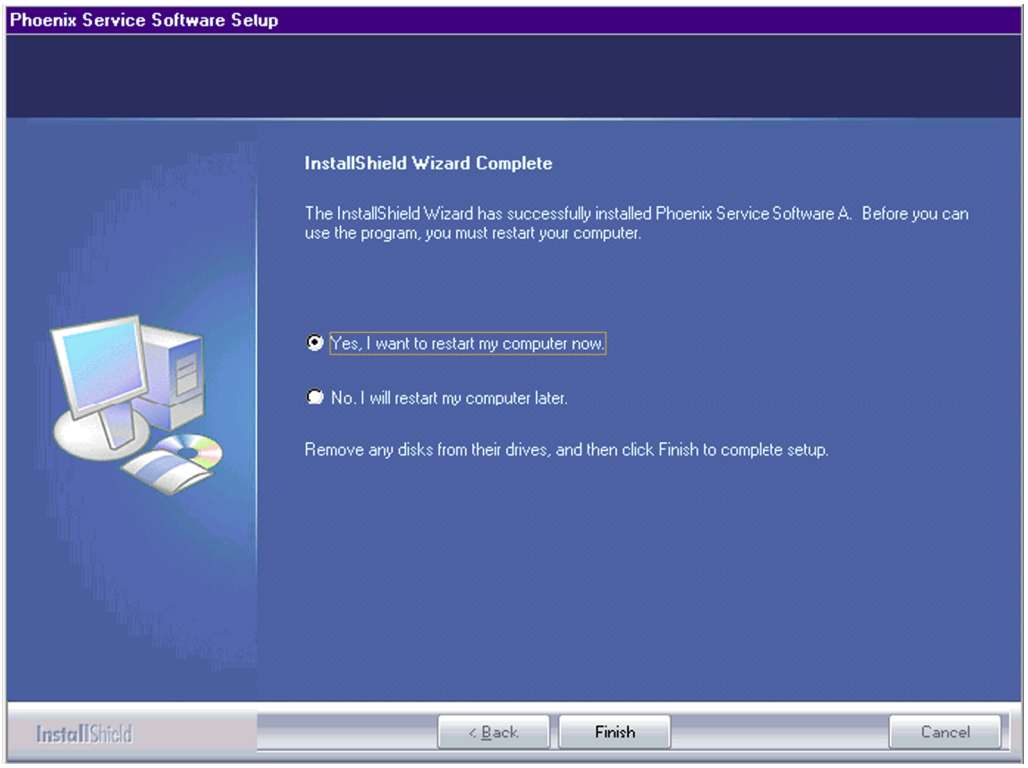

Figure 12 Restart computer

After the reboot, components are registered and Phoenix is ready for use.

Note: Phoenix does not work, if components have not been registered.

Figure 13 Registering components 2

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7. Click **Finish** to end installation.

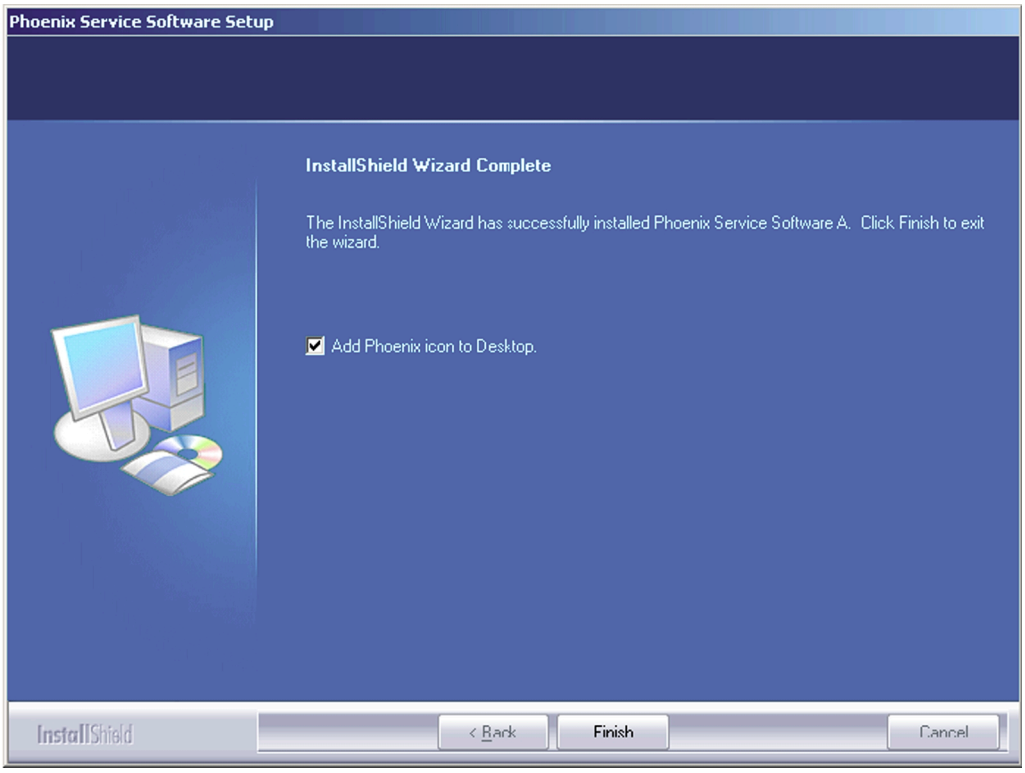

Figure 14 Finish installation

Phoenix is now ready for use.

Next actions

Before using Phoenix Service Software, you must:

- install phone model specific data package for Phoenix, and
- configure users and connections.

FPS-8* can be used after updating its Flash Update Package files.

Phoenix update installation

If you already have the Phoenix Service SW installed on your computer, sooner or later there will be need to update it when new versions are released.

Always use the latest available versions of both the Phoenix Service SW and the phone-specific Data Package. Instructions can be found in phone model specific Technical Bulletins and Phone Data Package readme.txt files (shown during installation).

To update the Phoenix Service Software you need to take exactly the same steps as when installing it for the first time:

- Download the installation package to your computer hard disk.
- Close all other programs.
- Run the application file (for example, phoenix_service_sw_a15_2004_24_7_55.exe).
- New version of Phoenix will be installed.
- Driver versions will be checked and updated.

When you update Phoenix from old to new version (for example, a14_2004_16_4_47 to a15_2004_24_7_55), the update will take place automatically without uninstallation.

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If you try to update the Phoenix Service Software with the same version that you already have (for example, a15_2004_24_7_55 to a15_2004_24_7_55) you are asked if you want to uninstall the version of Phoenix you have on your PC. In this case you can choose between total uninstallation and repair just like when you choose to uninstall Phoenix service software from the Windows Control panel.

If you try to install an older version (for example, downgrade from a15_2004_24_7_55 to a14_2004_16_4_47), installation will be interrupted.

Always follow the instructions on the screen.

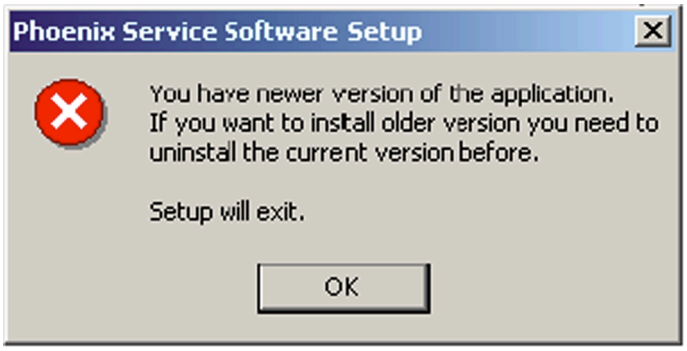

Figure 15 Installation interrupted

Uninstalling Phoenix

Context

Uninstallation can be done manually from **Windows Control Panel→Add/Remove Programs** .

Steps

1. Choose **Phoenix Service Software→Add/Remove→Remove** to uninstall Phoenix.

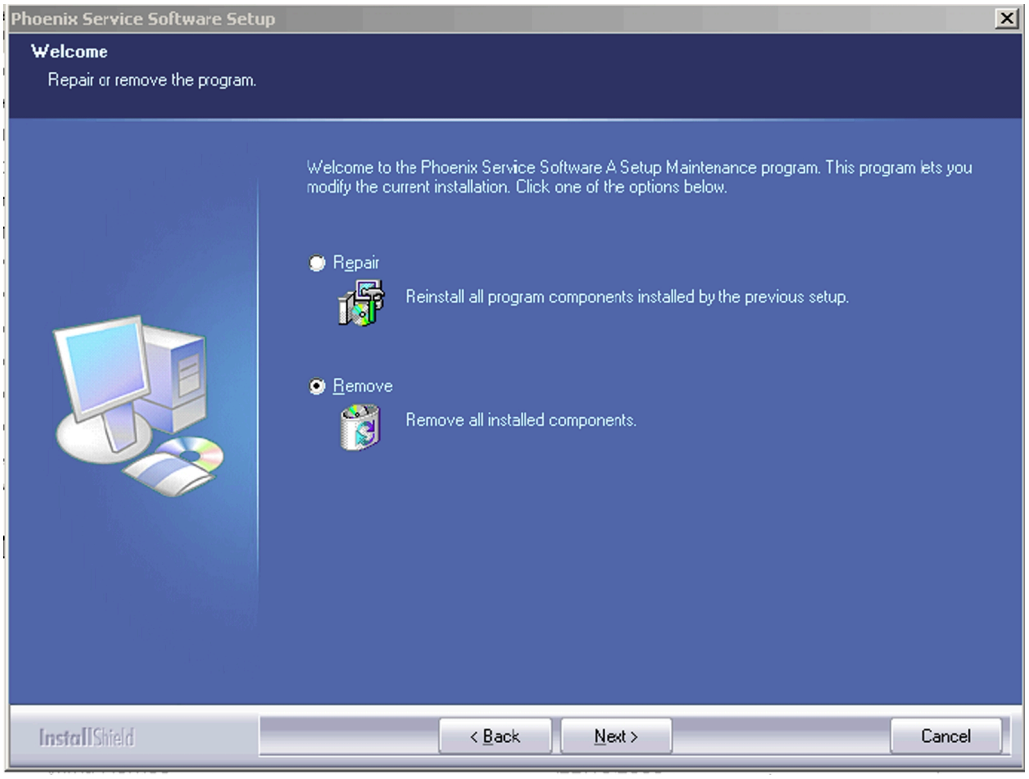

Figure 16 Remove program

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The progress of the uninstallation is shown.

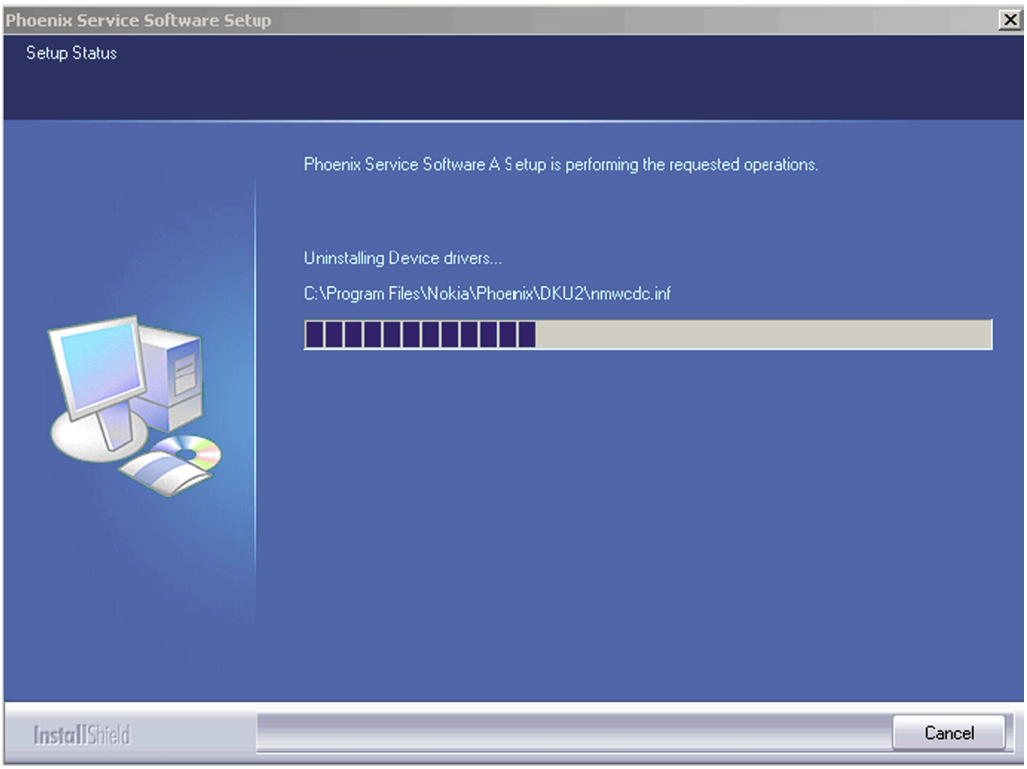

Figure 17 Uninstallation status

2. If the operating system does not require rebooting, click **Finish** to complete.

   Else, Install Shield Wizard will tell you about it. Select **Yes...** to reboot the PC immediately and **No...** to reboot the PC manually afterwards.

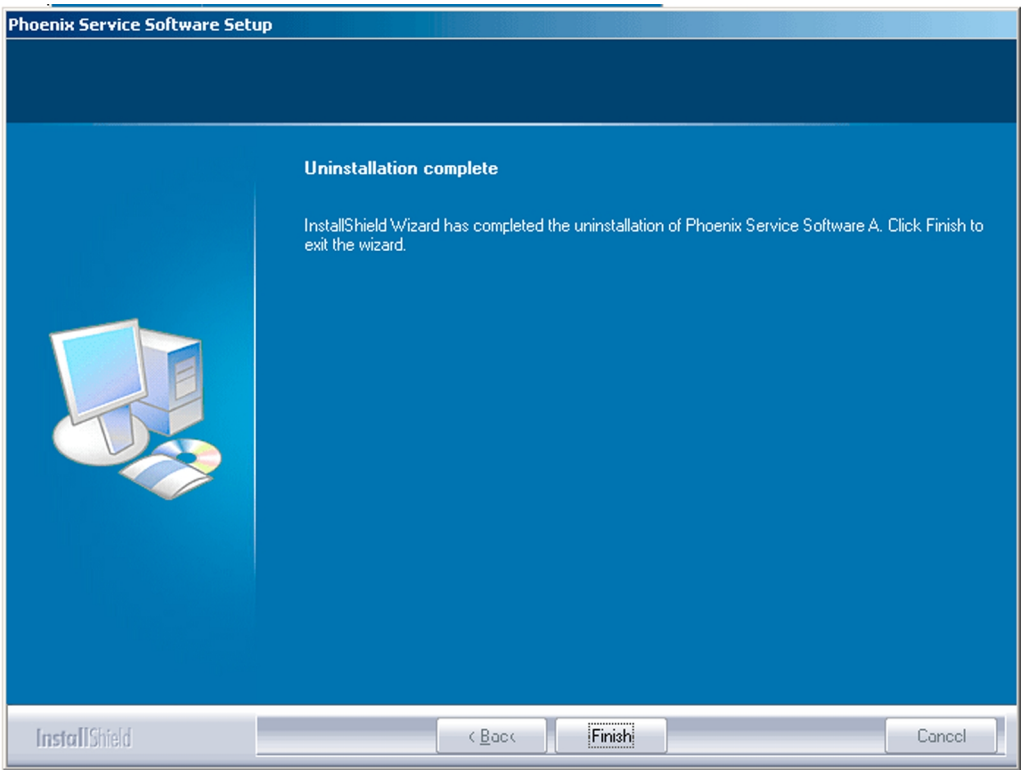

Figure 18 Finish uninstallation

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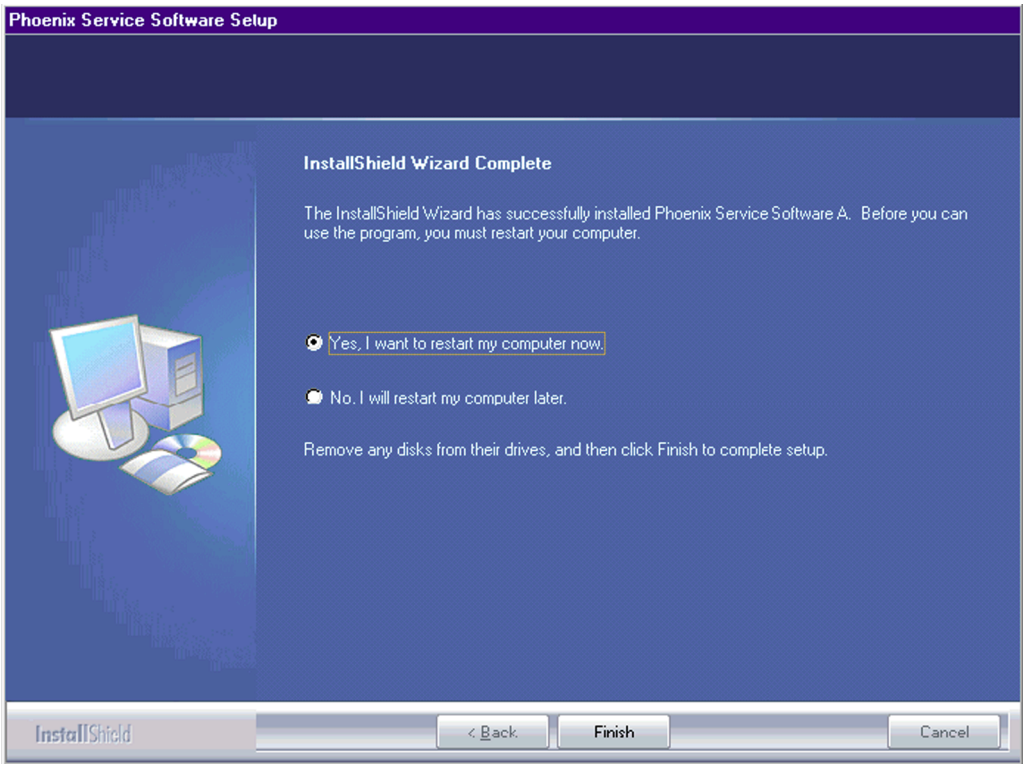

Figure 19 Restart computer

Repairing Phoenix installation

Context

If you experience any problems with the service software, or suspect that files have been lost, you can use the repair function before completely reinstalling Phoenix.

> **Note:** The original installation package (for example, *phoenix_service_sw_a15_2004_24_7_55.exe*) must be found on your PC when you run the repair setup.

Steps

1. Open **Windows Control Panel→Add/Remove Programs** .
2. Select **Phoenix Service Software→Add/Remove** .
3. In the following view, choose **Repair**.

   Phoenix will now reinstall components and register them. The procedure is the same as in the update installation.

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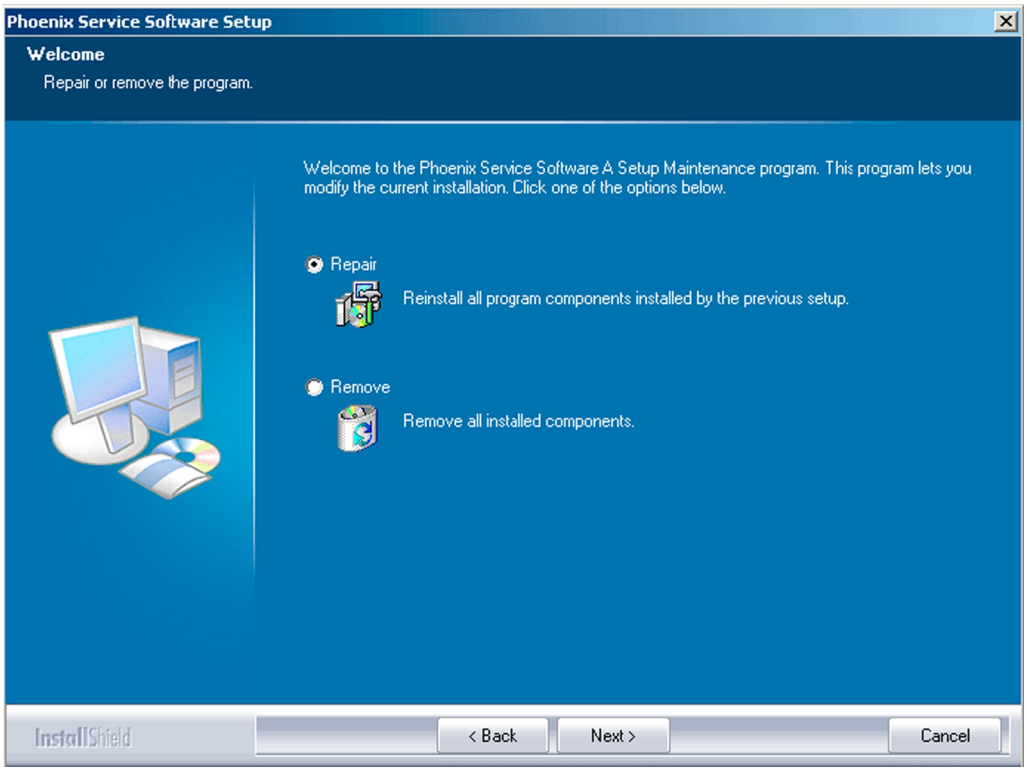

Figure 20 Repair program

4. Click **Finish** to complete repair.

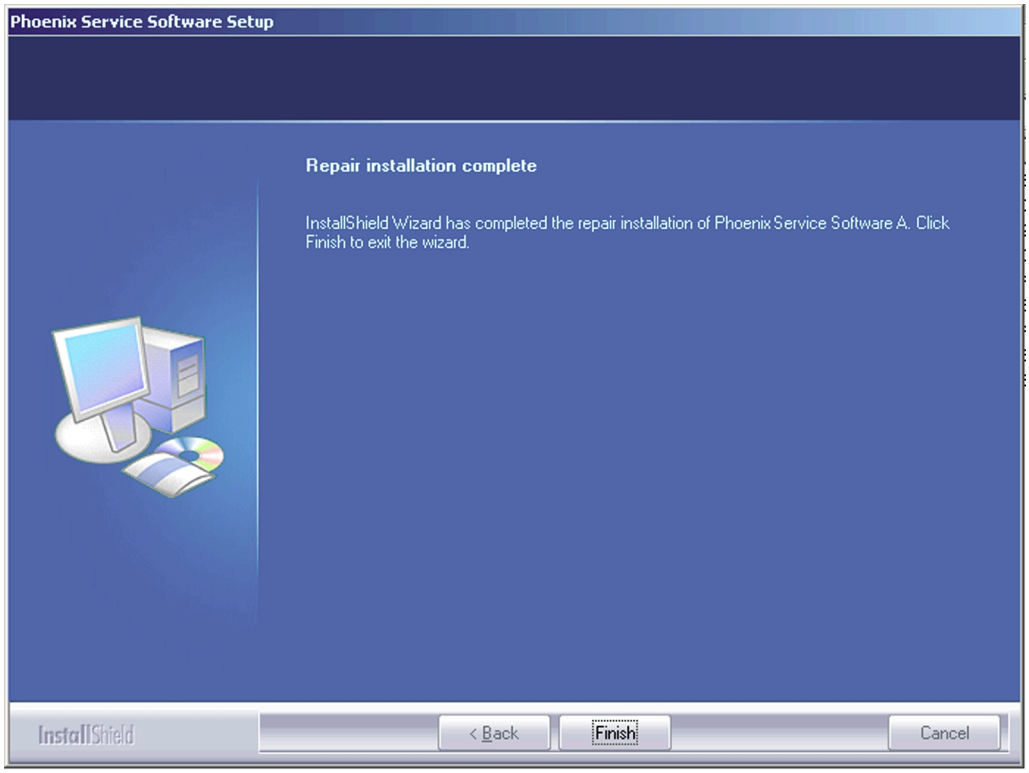

Figure 21 Finish repair installation

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Phoenix service software data package overview

Each product has its own data package (DP). This contains all product-specific data files to make the Phoenix Service Software and tools usable with a certain phone model:

- Product software binary files
- Files for type label printing
- Validation file for the faultlog repair data reporting system
- All product-specific configuration files for Phoenix Service Software components

Data files are stored under C:\Program Files\Nokia\Phoenix (default).

Installing Phoenix data package

Prerequisites

1 Verify that The data package contains all product-specific data to make the Phoenix Service Software and tools usable with a certain phone model.

2 Check that the dongle is attached to the parallel port of your computer.

3 Install Phoenix Service SW.

4 Download the installation package (for example, *RM-51_dp_EA_v_1_0.exe*) to your computer (for example, in *C:|TEMP*).

5 Close all other programs.

6 Run the application file (for example, *RM-51_dp_EA_ v_1_0.exe*) and follow the instructions on the screen.

If you already have the Phoenix Service SW installed on your computer, you will need to update it when a new version is released.

> **Note:** Very often the Phoenix Service SW and the phone-specific data package for Phoenix come in pairs, meaning that a certain version of Phoenix can only be used with a certain version of the data package. Always use the latest available versions of both. Instructions can be found in phone model specific Technical Bulletins and *readme.txt* files of the data packages.

Steps

1. To start installation, run the application file (for example, *RM-51_dp_EA_ v_1_0.exe*).

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2. Click **Next**, and wait for the installation files to be extracted.

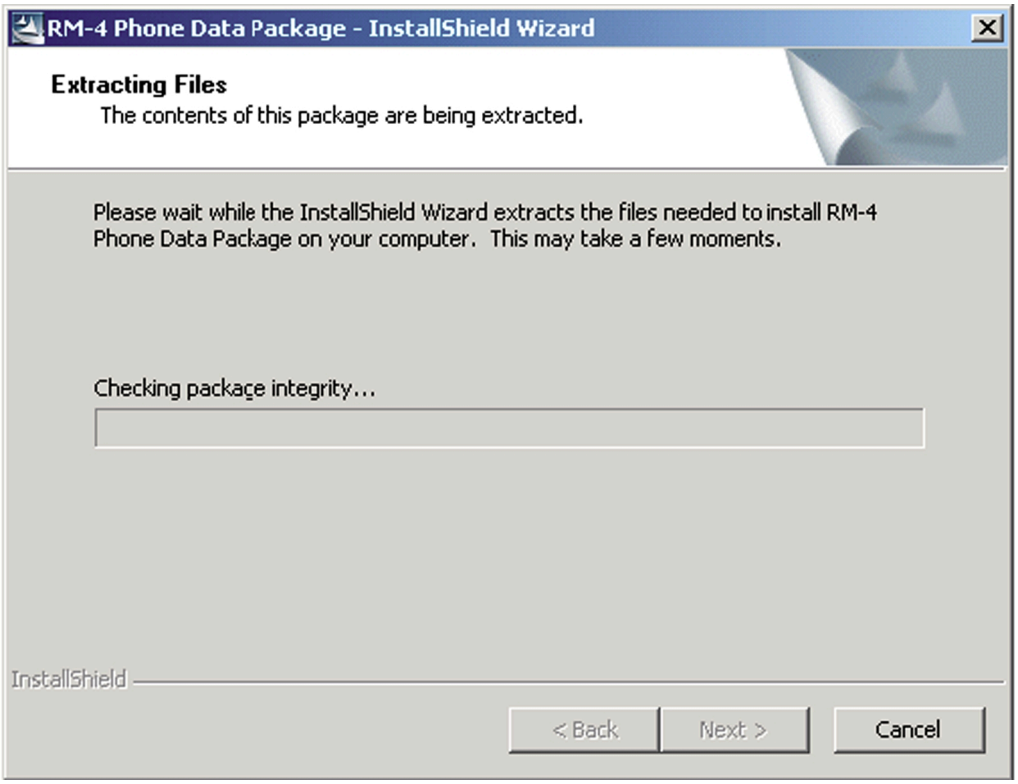

Figure 22 Extracting files

3. Click **Next** to continue.

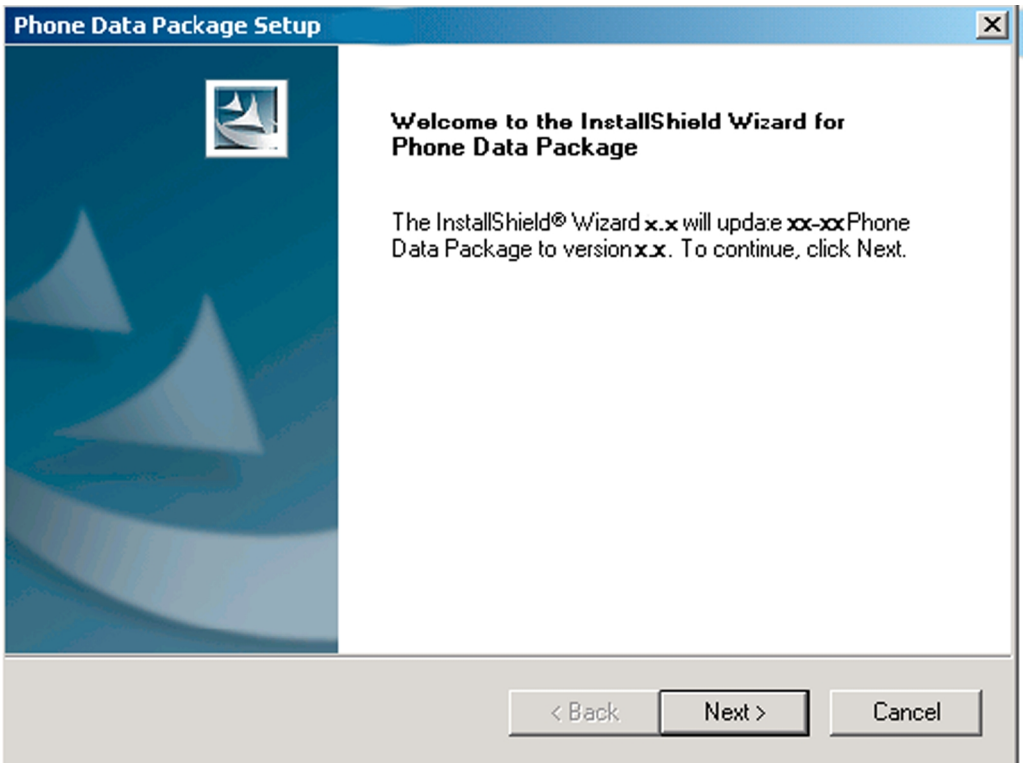

Figure 23 Continue data package installation

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In this view you can see the contents of the data package. Read the text carefully. There should be information about the Phoenix version required with this data package.

Click **Next** to continue.

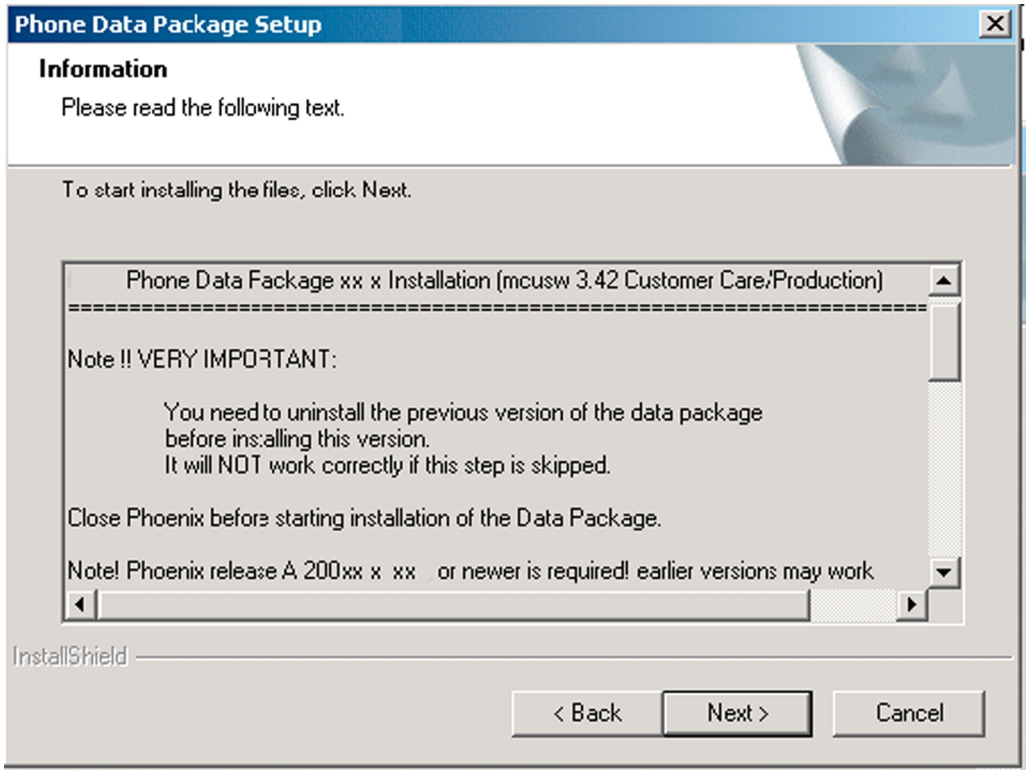

Figure 24 Data package setup information

4. Confirm location and click **Next** to continue.

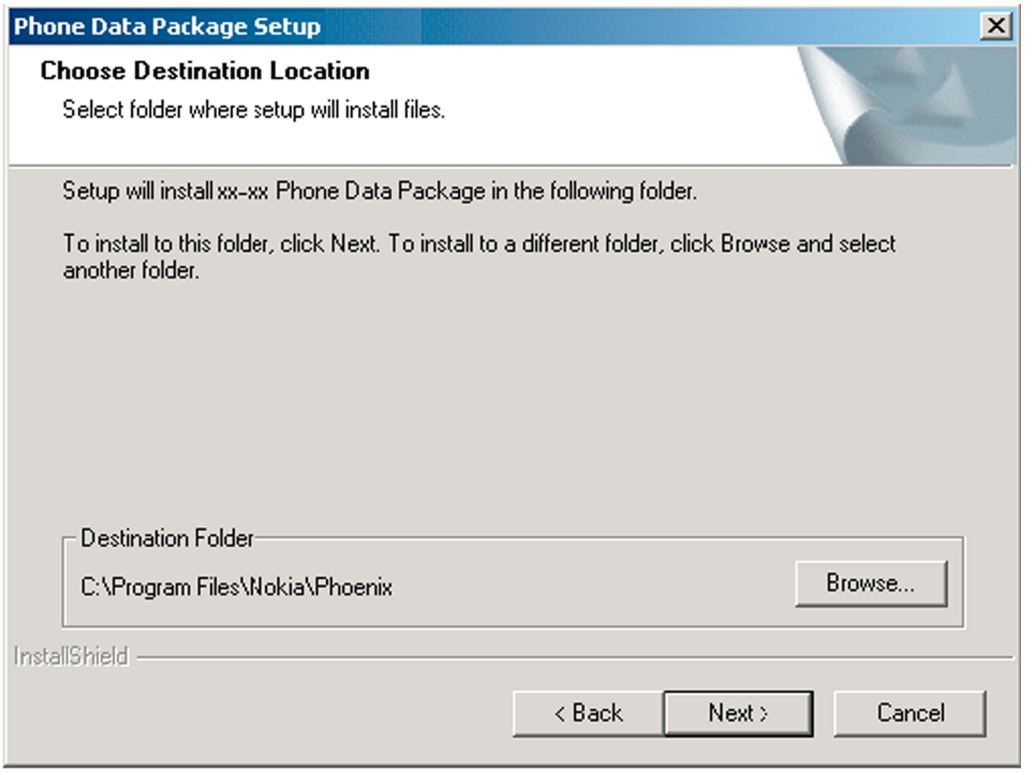

Figure 25 Data package destination folder

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The install shield checks where the Phoenix application is installed and the directory is shown.
Click **Next** to continue.

5. Click **Next** to start copying the files.
   Phone model specific files will be installed. Please wait.

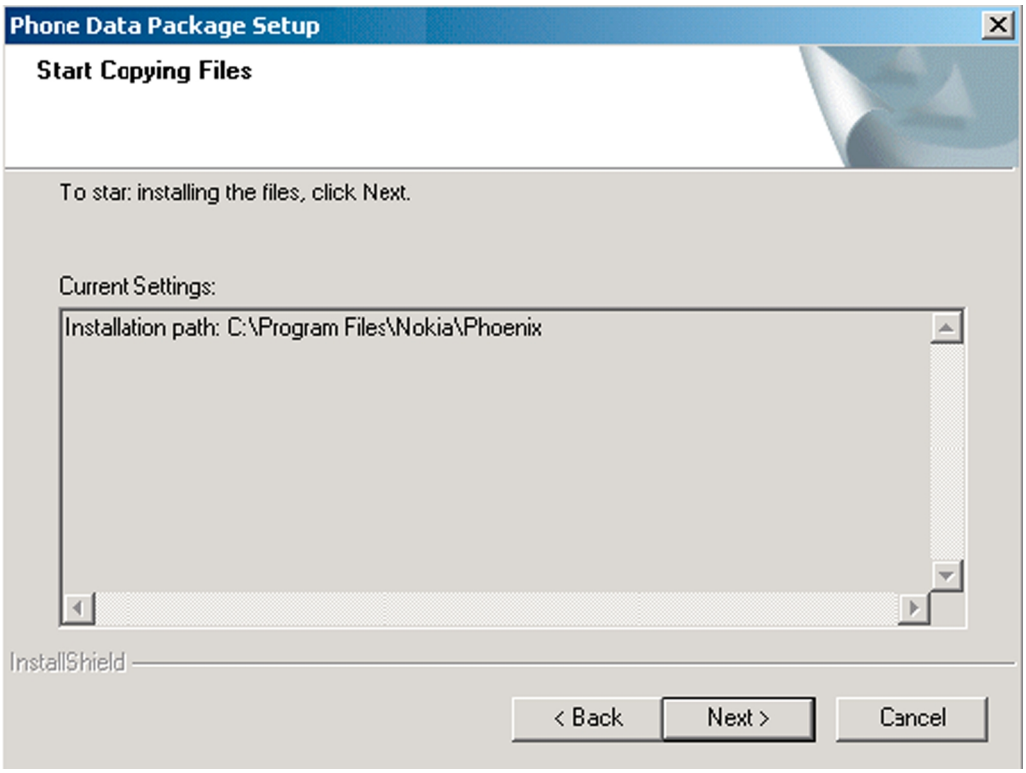

Figure 26 Start copying files

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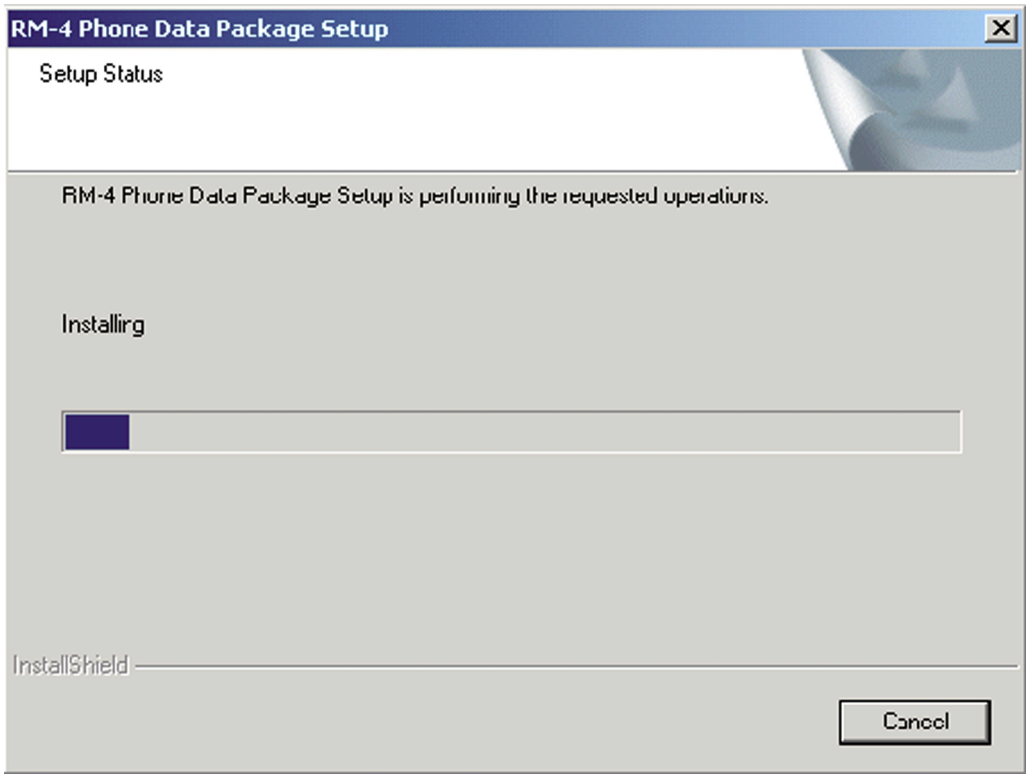

Figure 27 Data package installation status

6. Click **Finish** to complete the installation.

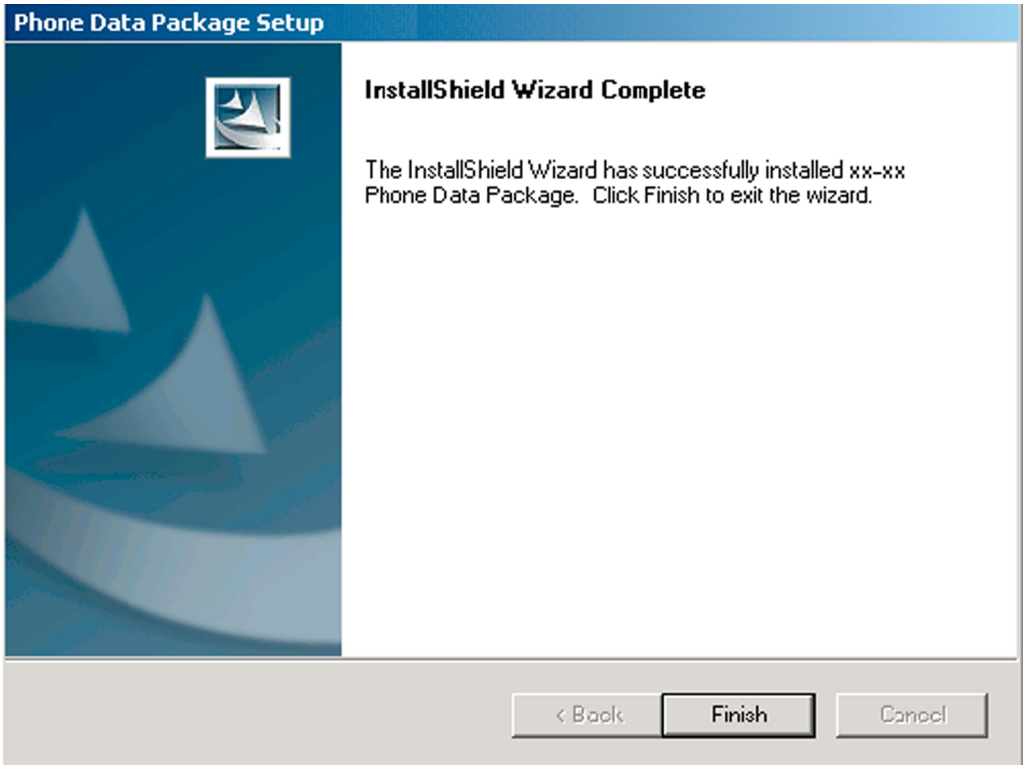

Figure 28 Finish data package installation

You now have all phone model specific files installed in your Phoenix Service SW.

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Next actions

Phoenix can be used, for example, for flashing phones and printing type labels. But first you must:

- configure users, and
- manage connections.

FLS-4S can be used right away.

FPS-8* can be used after updating Flash Update Package files.

Uninstalling Phoenix data package

Context

If you try to install the same version of Phoenix data package that you already have, you are asked if you want to uninstall the version you have on your PC. Older versions of data packages don´t need to be uninstalled unless instructions to do so are given in the *readme.txt* file of the data package and bulletins concerning the release. Please read all related documents carefully.

Steps

1. Click **OK** to uninstall, **Cancel** if you don't want to uninstall.

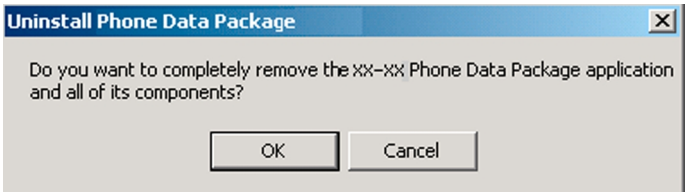

Figure 29 Uninstalling Phoenix data package

2. Once the previously installed data package is uninstalled, click **Finish**.

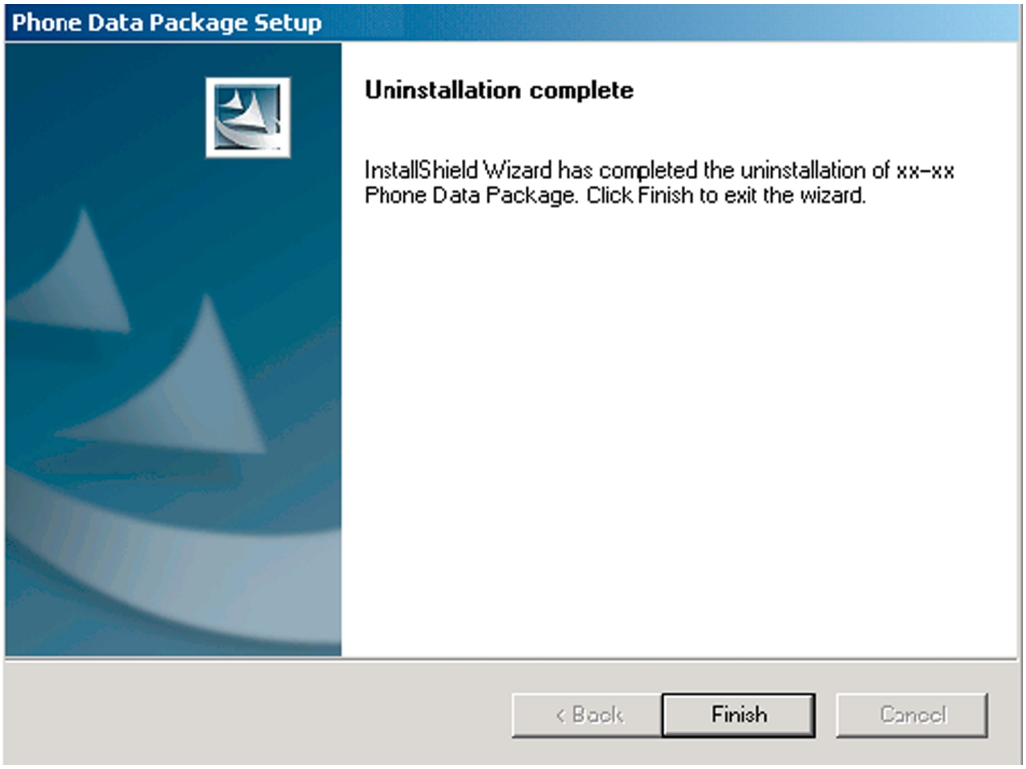

Figure 30 Finish data package uninstallation

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Alternative steps

- Uninstallation can also be done manually from **Windows Control Panel→Add/Remove Programs→xx-xx (* Phone Data Package)** . (*= type designator of the phone

Next actions

Run the installation package again to continue installation from the beginning.

Service software instructions

Configuring users in Phoenix

Steps

1. Start Phoenix Service SW and log in.

   If your user ID is already configured, choose it from the dropdown list and click **OK**. To add a new user or edit existing ones click **Maintain**.

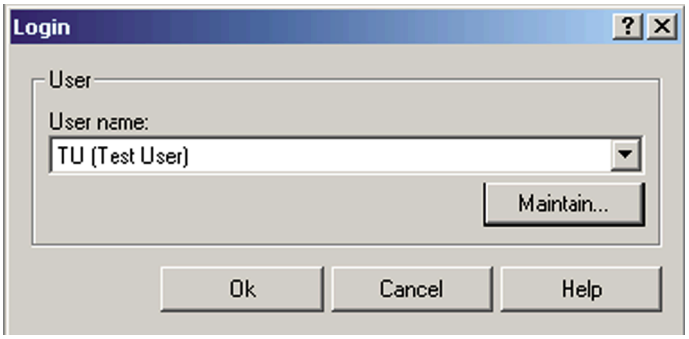

Figure 31 Login

2. Choose **New** to add information for a new user.

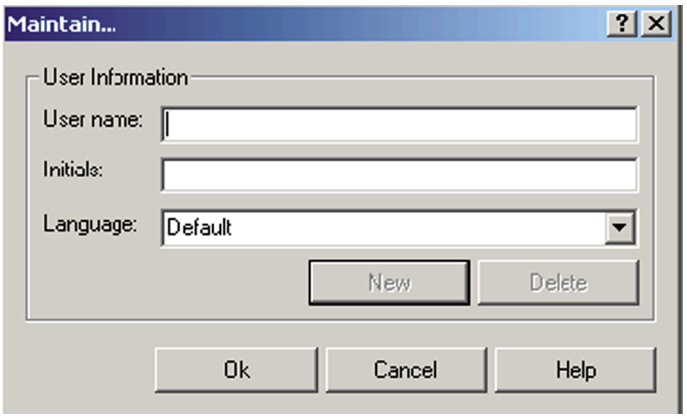

Figure 32 Add information for new user 1

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3. Type in your name and initials and click **OK**.

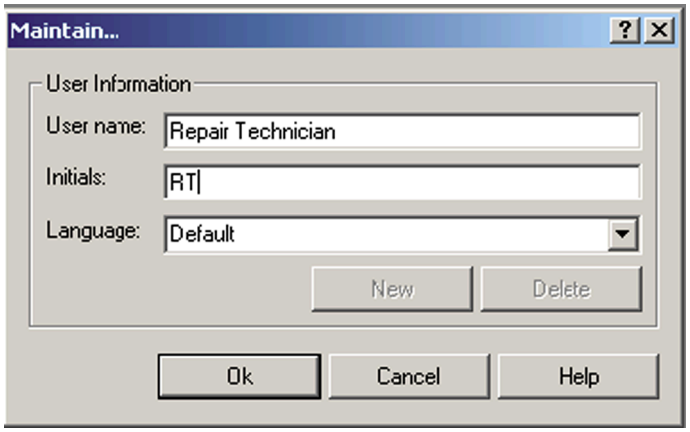

Figure 33 Add information for new user 2

A new user is now created.

4. Click **OK**.

   You are now able to login with this user name.

5. Click **OK**.

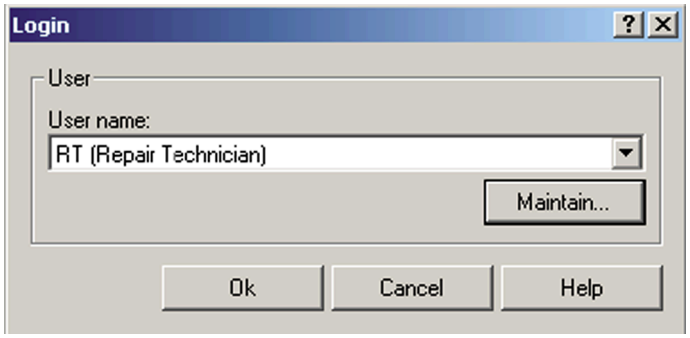

Figure 34 Login, user configured

Managing connections in Phoenix

Steps

1. Start *Phoenix Service SW* and log in.

Figure 35 Phoenix icon

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2. Choose **File→Manage Connections** .

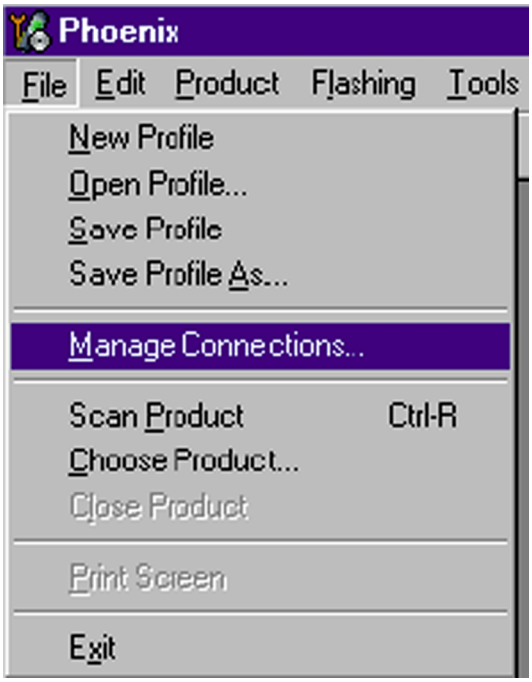

Figure 36 Manage connections

Existing connections can be selected, edited, deleted, and new ones created by using this dialog.

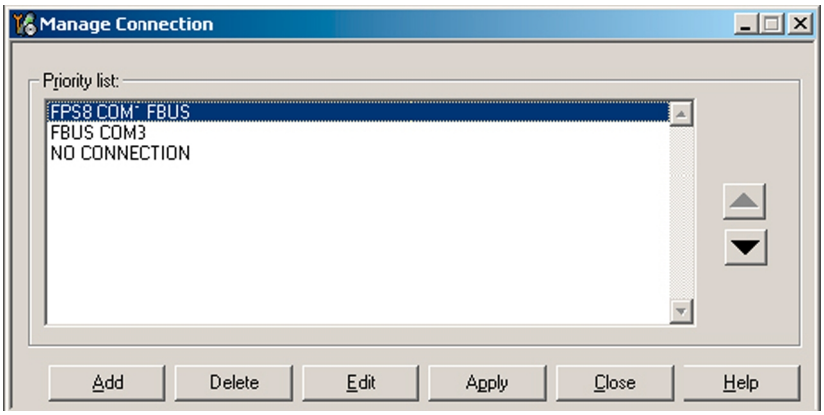

Figure 37 Connections list

3. Click **Add** to add a new connection, and select if you want to create it manually or by using the Connection Wizard.

   In the following dialogs you will be asked to select settings for the connection. If you use the Wizard, connect the tools and a phone to your PC and the wizard will automatically try to configure the correct connection.

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4. Select **Manual** mode, and click **Next** to continue.

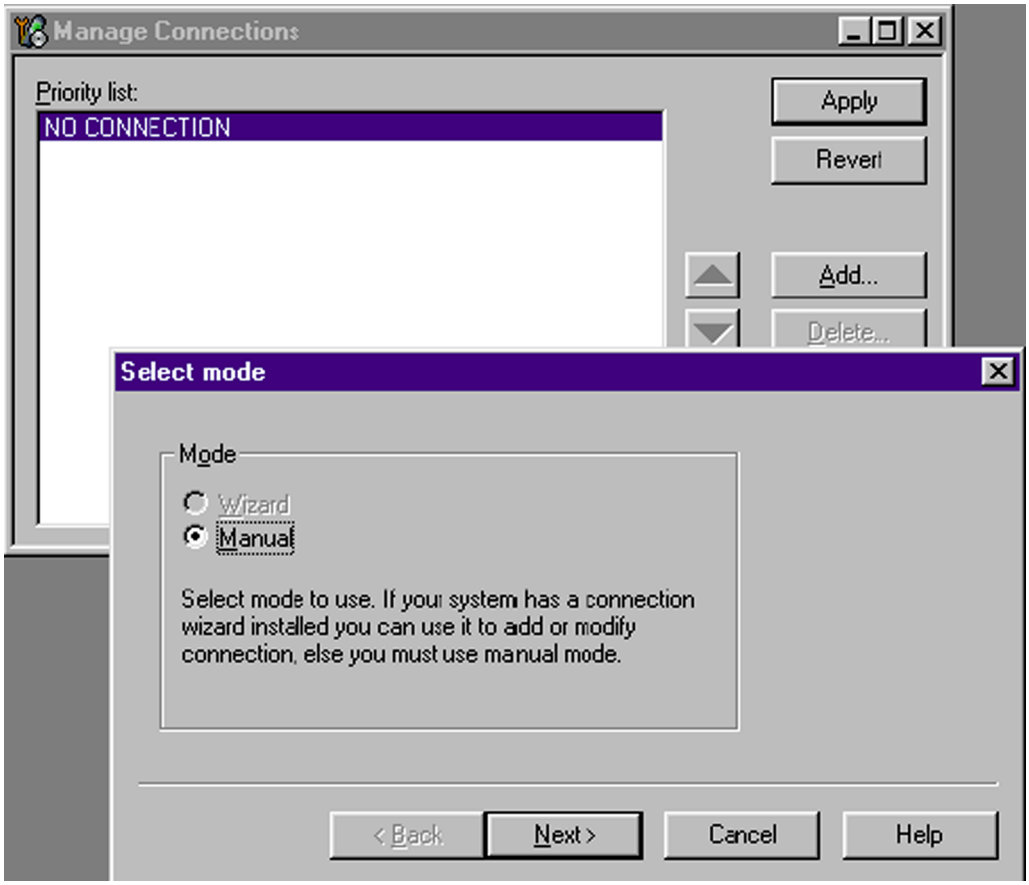

Figure 38 Select mode: Manual

i For FLS-4S POS Flash Device, choose the following connection settings:
- Media: FBUS
- COM Port: Virtual COM Port used by FLS-4

  Note: ALWAYS check this. Go to **Windows→Control Panel→FLS Virtual Port→Configuration** .

Figure 39 FLS virtual port icon

ii For FPS-8 Flash Prommer, choose the following connection settings:
- Media: FPS-8
- Port Num: COM Port where FPS-8 is connected
- COMBOX_DEF_MEDIA: FBUS

5. Click **Finish** to complete the configuration.

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6. Activate the connection you want to use by clicking it, use up/down arrows to move it on top of the list, and click **Apply**.

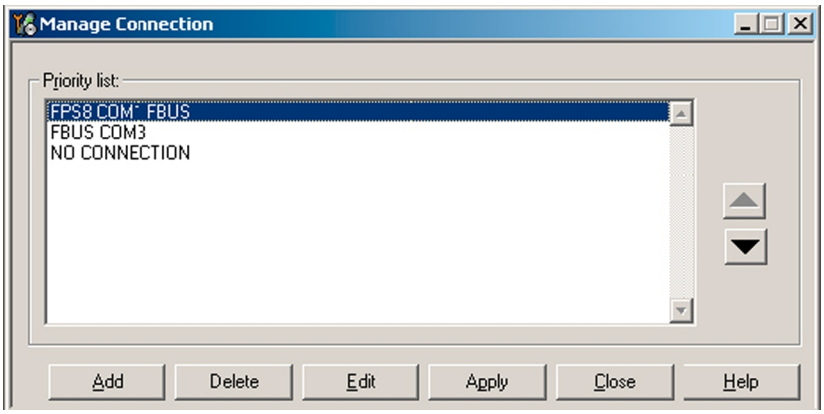

Figure 40 Connections list

The connection is now selected and can be used after closing the *Manage Connections* window.

Selected connection will be shown on the right hand bottom corner of the screen.

Figure 41 Connection information

7. To use the selected connection, connect the phone to Phoenix with correct service tools, make sure that it is switched on and select **Scan Product**.

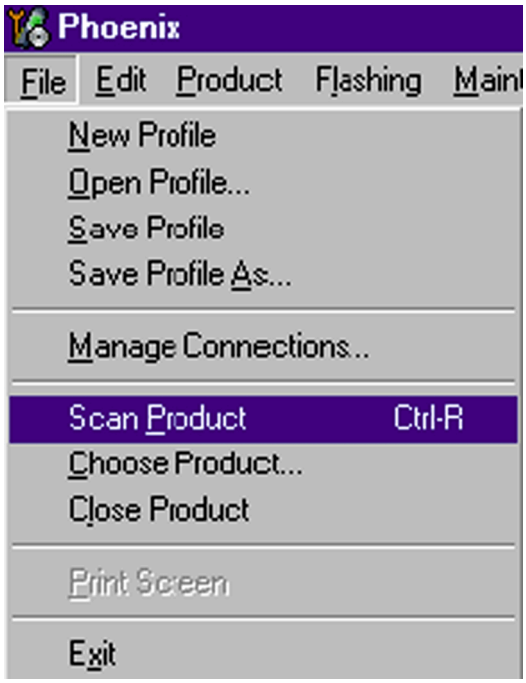

Figure 42 Scan product

When a product is found, Phoenix will load product support. Name of the loaded product support module and its version information will be shown on the bottom of the screen.

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Figure 43 Product support module information

Installing Flash support files for FPS-8* and FLS-4*

Prerequisites

Note: This is a separate installation package.

- Install Phoenix Service SW.
- Install phone model specific data package for Phoenix.
- The flash support files are delivered in the same installation package with Phoenix data packages or newer Phoenix packages since September 2003.
- Normally it is enough to install Phoenix and the phone-specific data package because the Phoenix installation always includes the latest flash update package files for FLS-4S/FPS-8*.
- A separate installation package for flash support files is available, and the files can be updated according to this instruction if updates appear between Phoenix/data package releases.

Context

If you are not using a separate installation package, you can skip this section and continue with FPS-8 Flash prommer SW update (page 3–32) after installing a new phone data package.

Steps

1. Start by double clicking *flash_update_03_13_001.exe* to begin installation.

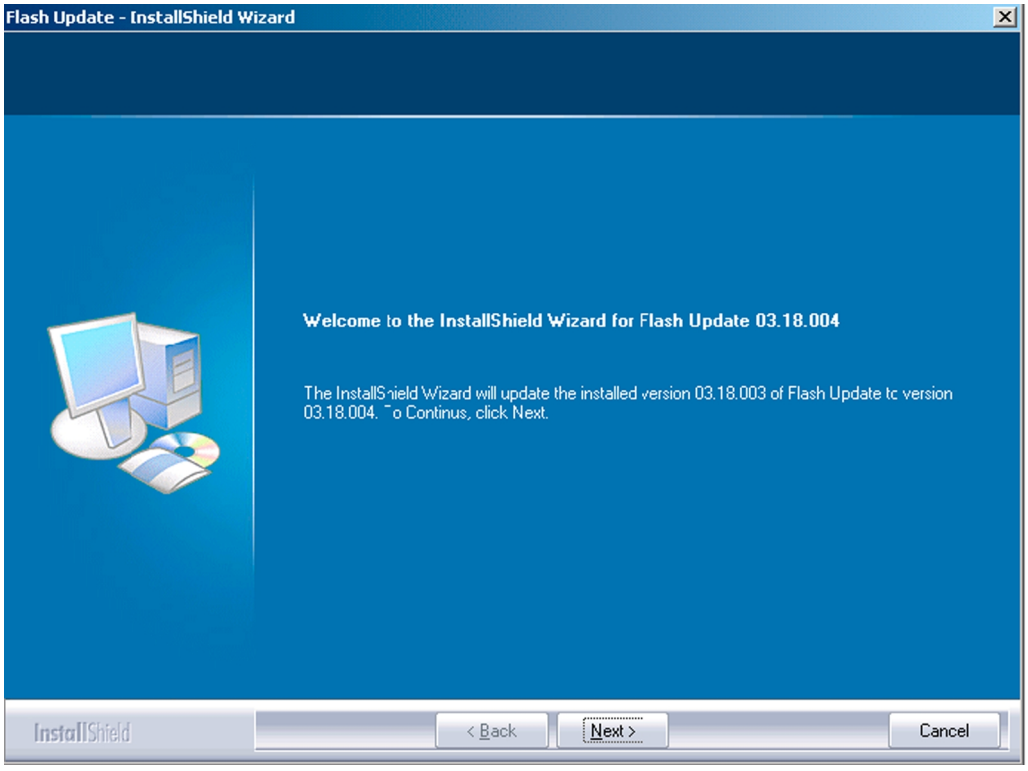

Figure 44 Flash update welcome dialog

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2. If the same version of Flash Update package already exists, and you want to reinstall it, the previous package is first uninstalled. Run the installation again.

Figure 45 Uninstall flash update package

If you try to downgrade the existing version to older ones, the setup will be aborted. If you really want to downgrade, uninstall newer files manually from **Control Panel** and then rerun the installation again.

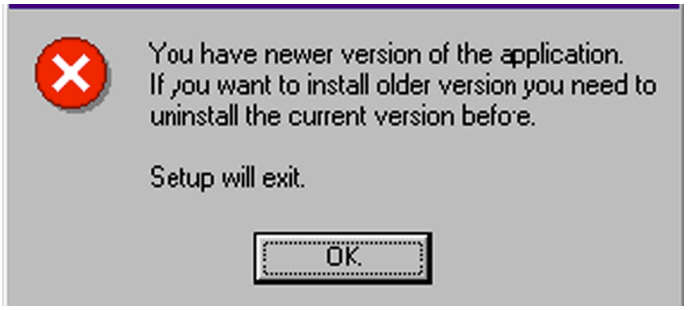

Figure 46 Flash installation interrupted

If an older version exists on your PC and it needs to be updated, click **Next** to continue installation.

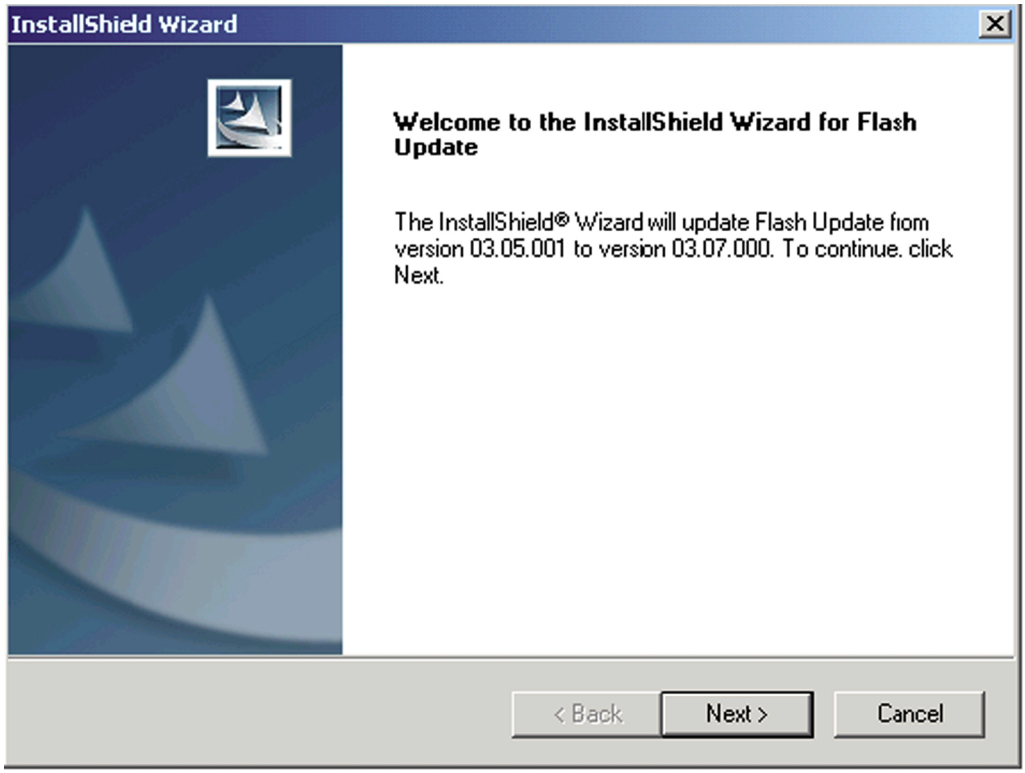

Figure 47 Continue flash update

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3. It is highly recommended to install the files to the default destination folder *C:|Program Files|Nokia|Phoenix*. Click **Next** to continue.

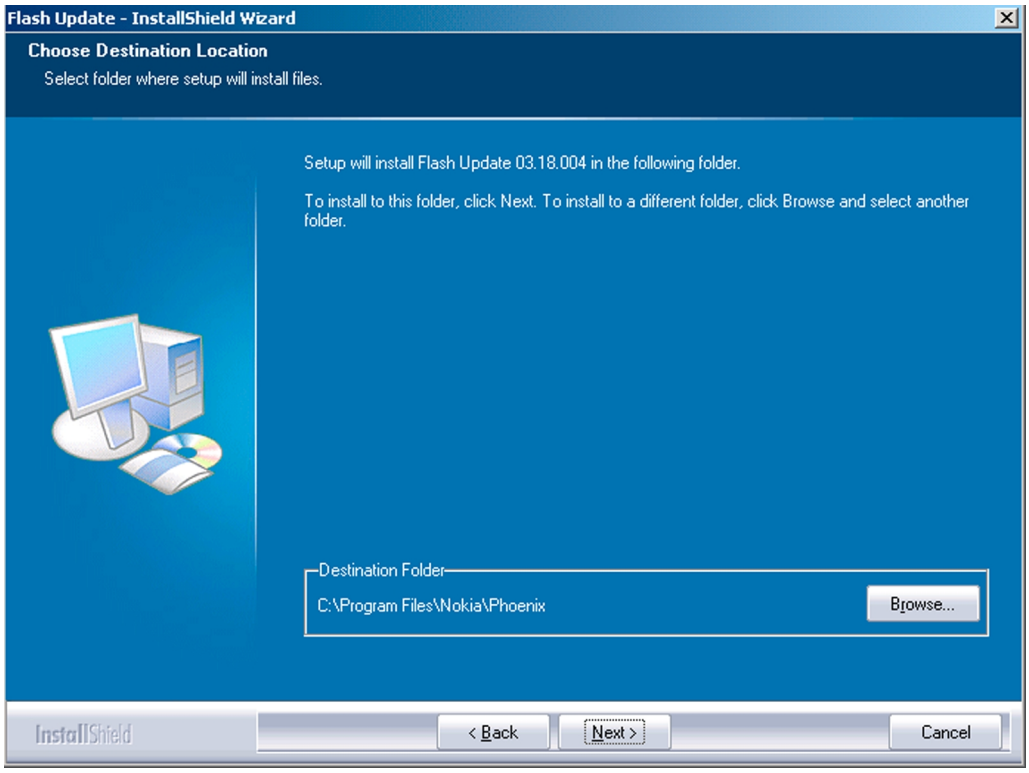

Figure 48 Flash destination folder

When installing the flash update files for the first time you may choose another location by selecting **Browse**. However, this is not recommended.

Installation will continue.

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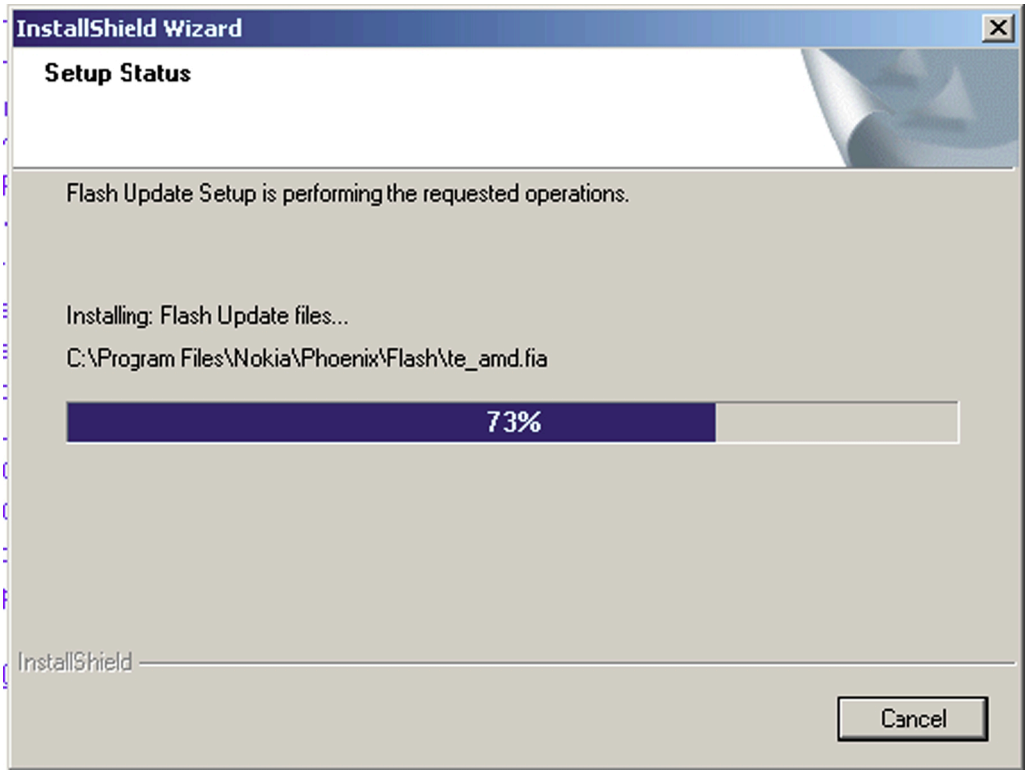

Figure 49 Flash installation status

4. Choose **Finish** to complete the installation procedure.

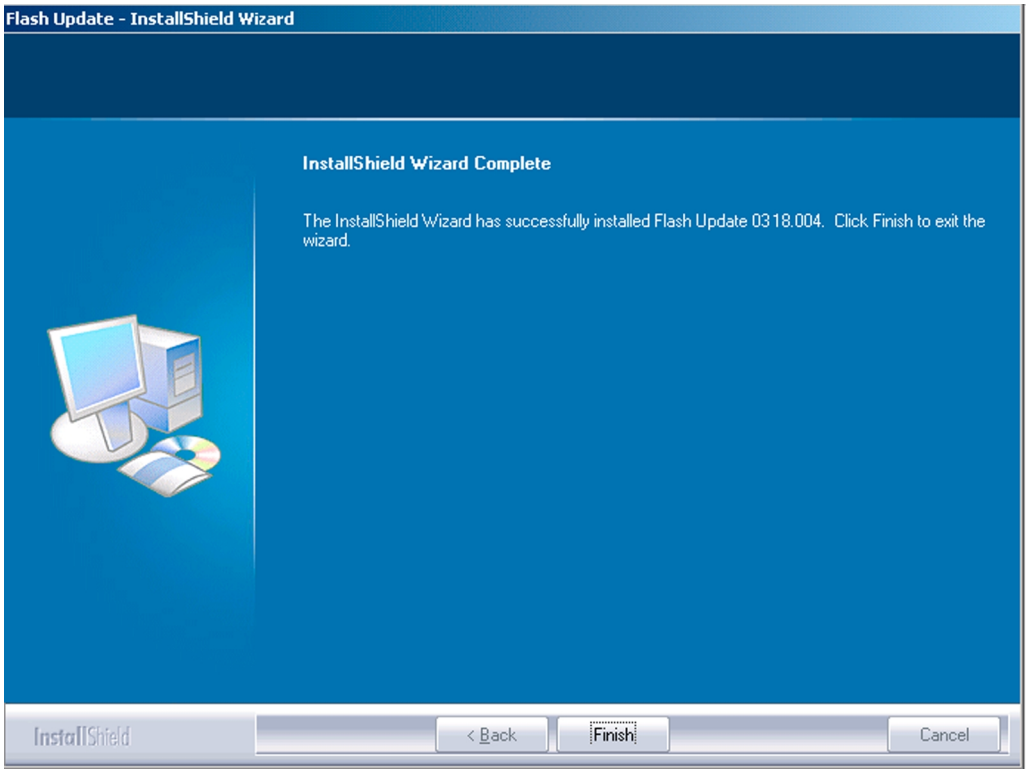

Figure 50 Finish flash update

Next actions

FLS-4 can be used right after the Flash Update Package is installed.

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FPS-8* flash prommer must be updated using Phoenix!

Updating FPS-8 Flash prommer software

Steps

1. Start *Phoenix Service Software* and log in, manage connection correctly for the FPS-8* flash prommer.

Figure 51 Phoenix icon

2. Choose **Flashing→FPS-8 Maintenance** .

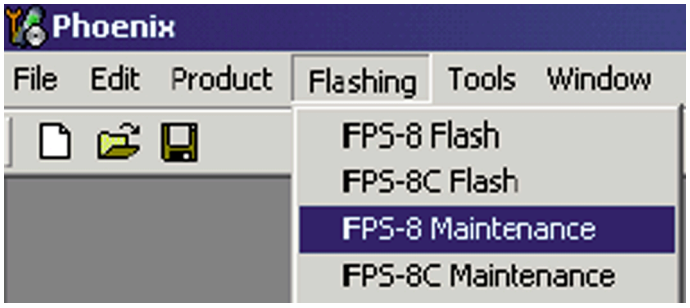

Figure 52 FPS-8 maintenance

Note: Screen shots may be different depending on the Phoenix version used and the connected components.

3. When the new FPS-8 flash update package is installed to computer you will be asked to update the files to your FPS-8 Prommer. Select **Yes** to update files.

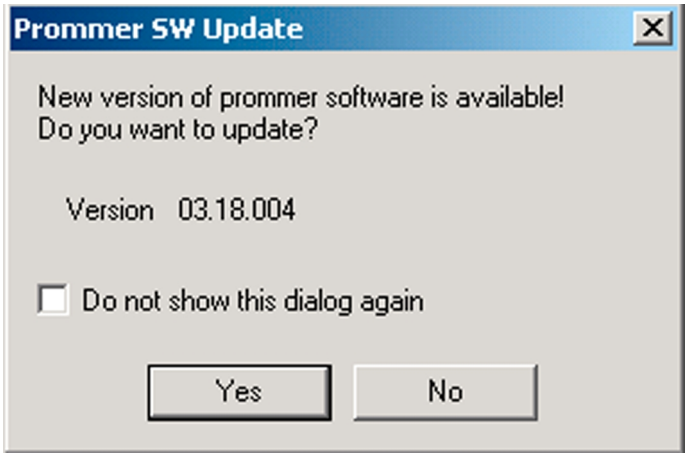

Figure 53 Prommer SW update

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4. Wait until you are notified that update has been successful; the procedure will take a couple of minutes. Click **OK** to close the *FPS-8 Maintenance* window.

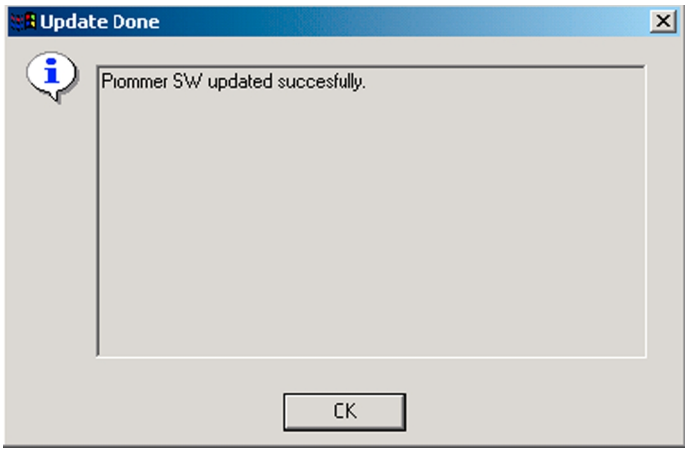

Figure 54 Prommer SW update done

View after successful prommer software update:

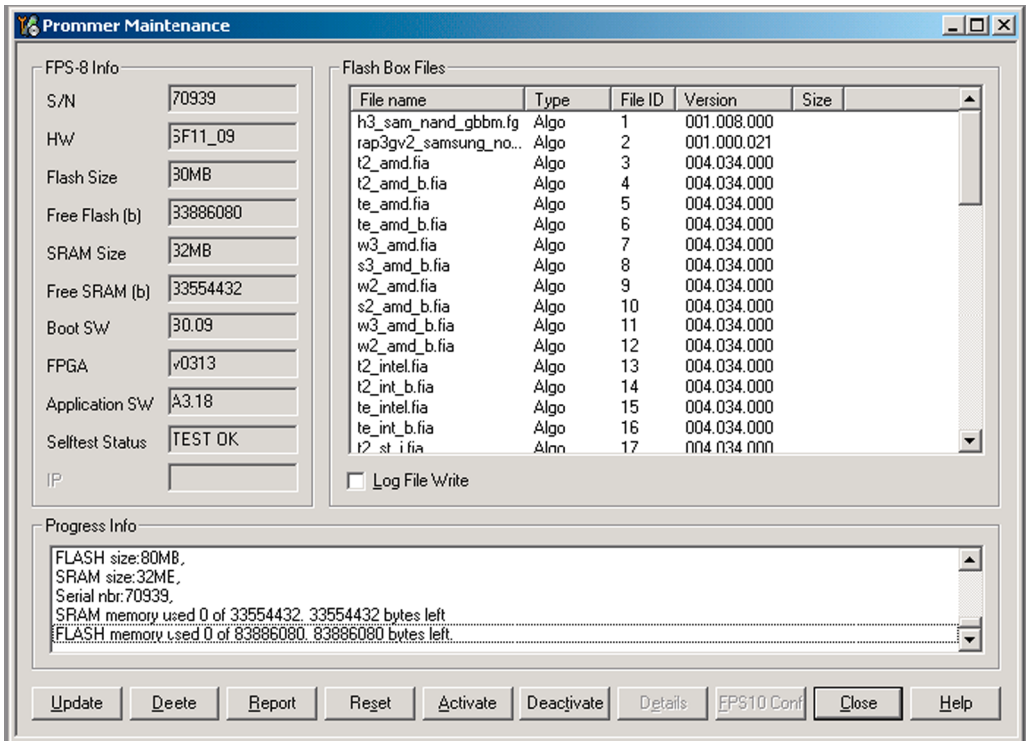

Figure 55 FPS-8 info window

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Alternative steps

- FPS-8 SW can also be updated by pressing **Update** button and selecting appropriate *fps8upd.ini* file in *C:|Program Files|Nokia|Phoenix|Flash*.

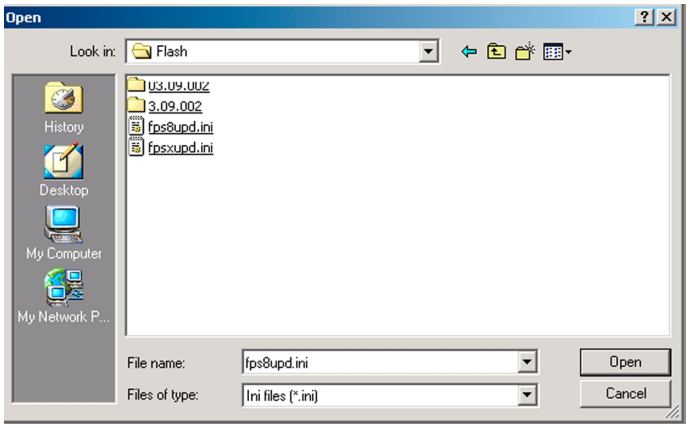

Figure 56 Flash directory window

- All files can be loaded separately to FPS-8. To do this, just press the right mouse button in the *Flash box files* window and select the file type to be loaded.

  More information can be found in Phoenix **Help**.

Activating FPS-8

Context

Before FPS-8 can be successfully used for phone programming, it must first be activated. Fill in first the *FPS-8 activation request* sheet in the FPS-8 sales package and follow the instructions on the sheet (included in sales package CD-ROM or from partner web site).

When activation file is received (for example, *00000.in*), copy it to *C:|ProgramFiles|Nokia|Phoenix|BoxActivation* directory on your computer (this directory is created when Phoenix is installed).

Steps

1. Start *Phoenix Service Software*.
2. Select **Flashing→FPS-8 maintenance** .

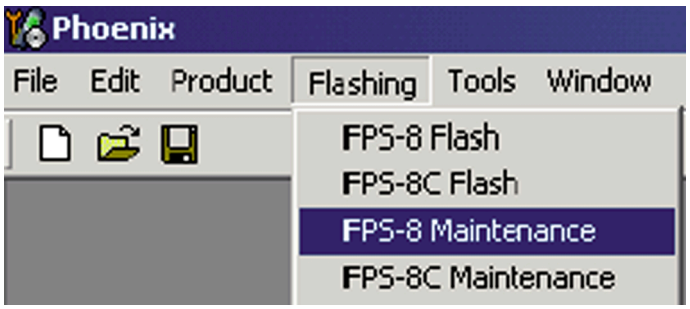

Figure 57 FPS-8 maintenance

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3. Click **Activate** in the *FPS-8 Maintenance* window.

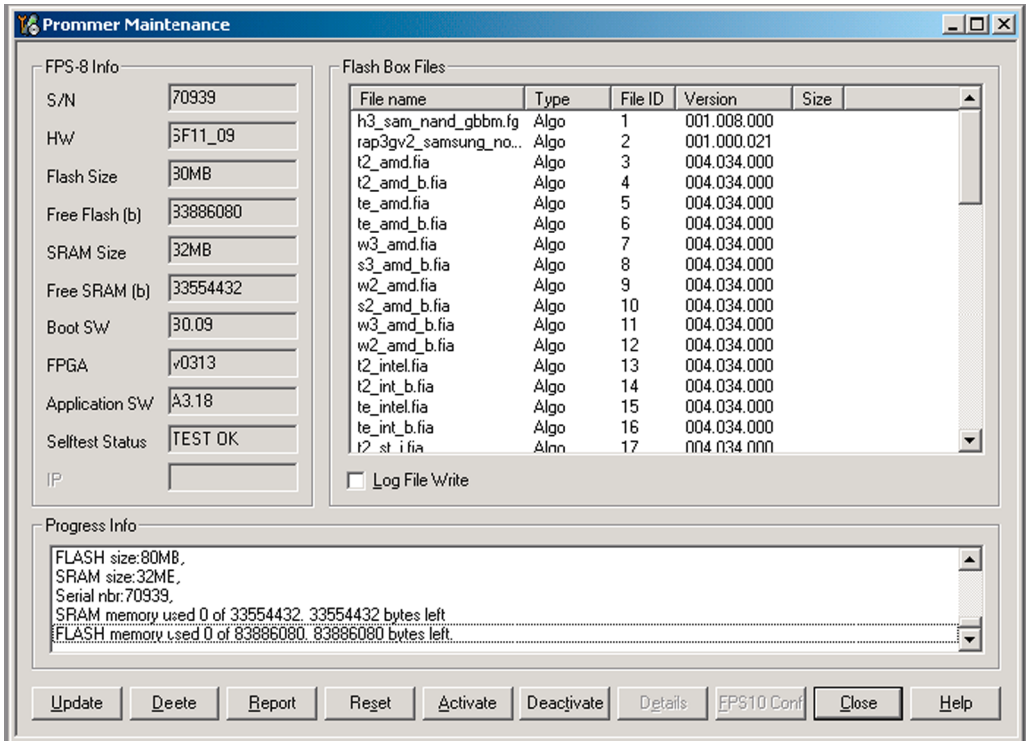

Figure 58 FPS-8 info window

If you saved the activation file to some other directory on your PC, **Browse** to find it

4. Click **Open** to activate the box.

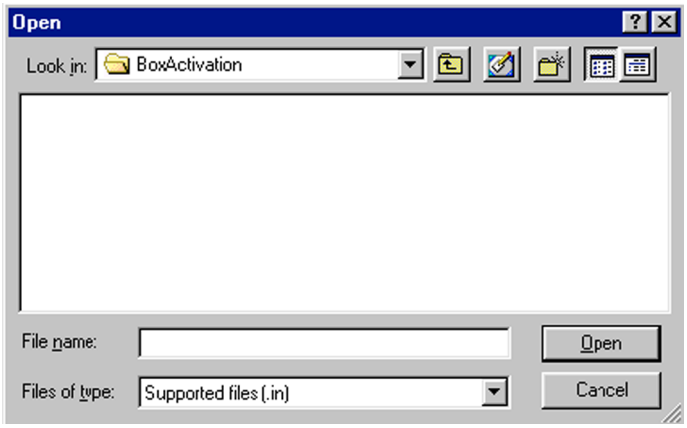

Figure 59 Box activation

5. Turn the FPS-8's power off and on to complete activation.

Deactivating FPS-8

Context

If there is, for example, a need to send the FPS-8 box for repair, it must be deactivated first.

Steps

1. Start *Phoenix* service software.
2. Choose **Flashing→Prommer Maintenance** .

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3. In the *Prommer Maintenance* window, click **Deactivate**.
4. To confirm the deactivation, click **Yes**.

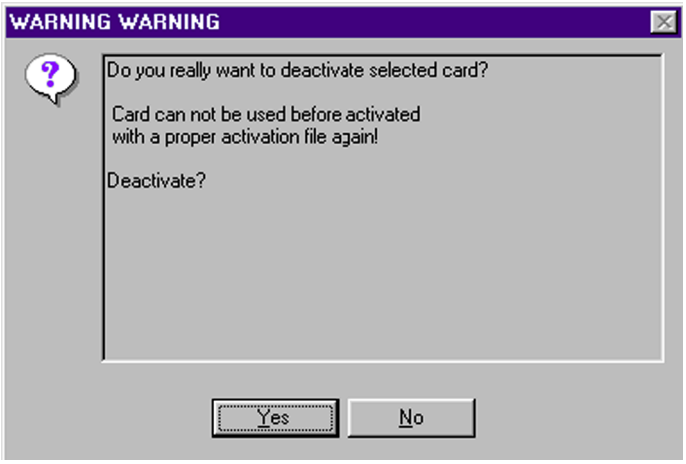

Figure 60 Deactivation warning

The box is deactivated.

5. To complete the deactivation, restart FPS-8.

Updating JBV-1 docking station software

Prerequisites

The JBV-1 docking station contains software (firmware) which can be updated. You need the following equipment to update the software:

- PC with USB connection
- operating system supporting USB (Not Win 95 or NT)
- USB Cable (can be purchased from shops or suppliers providing PC hardware and accessories)
- JBV-1 docking station
- external power supply (11-16V)

Before installation:

- Download *Jbv1_18_update.zip* file to your computer (in *C:|TEMP* for example) from your download web site.
- Close all other programs.
- Follow instructions on the screen.

Context

The JBV-1 docking station is a common tool for all DCT-4 generation products. In order to make the JBV-1 usable with different phone models, a phone-specific docking station adapter is used.

Steps

1. Run *Jbv1_18_update.zip* file and start software installation by double clicking *Setup.exe*.

   Note: DO NOT CONNECT THE USB CABLE/JBV-1 TO YOUR COMPUTER YET!

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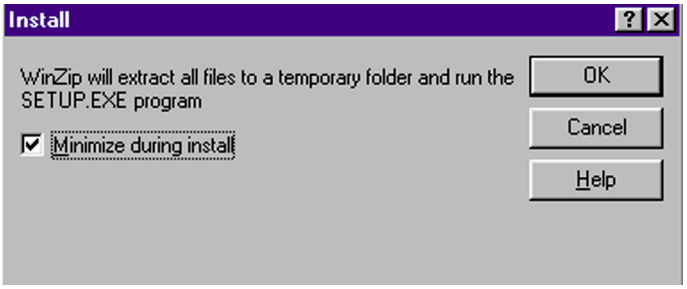

Figure 61 Extracting JBV-1 update files

Files needed for JBV-1 package setup program will be extracted.

2. Read the instructions in the dialog box and click **Next** to continue.

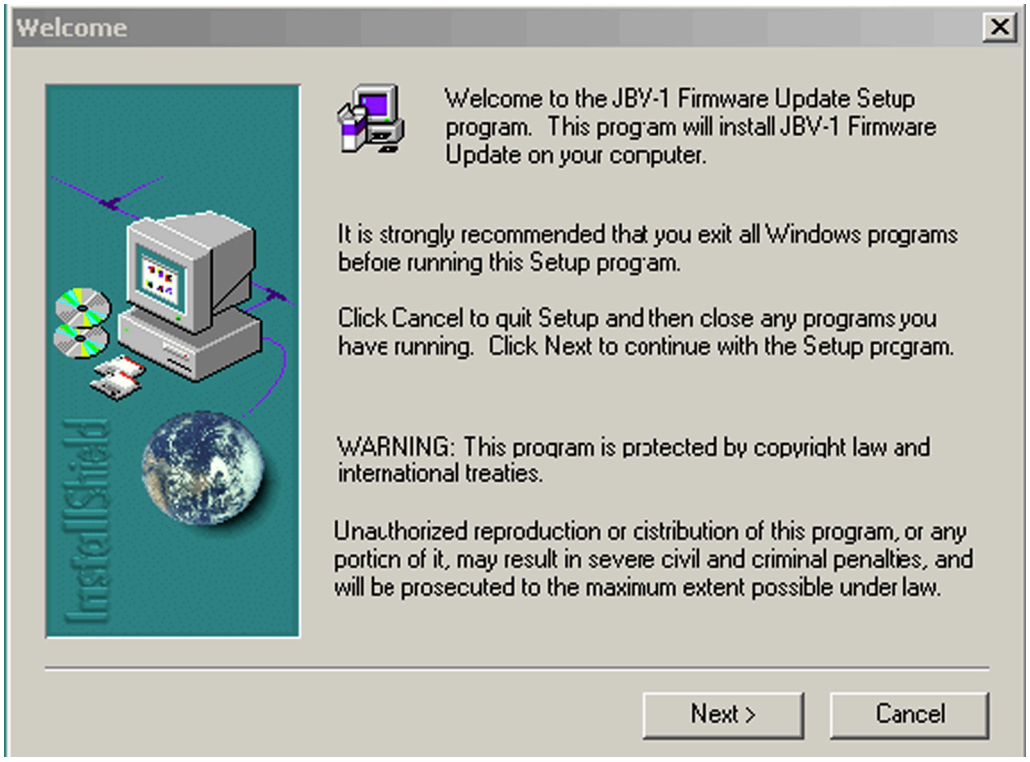

Figure 62 JBV-1 update information

3. Accept the suggested destination folder for installing the JBV-1 SW Package, and click **Next** to continue.

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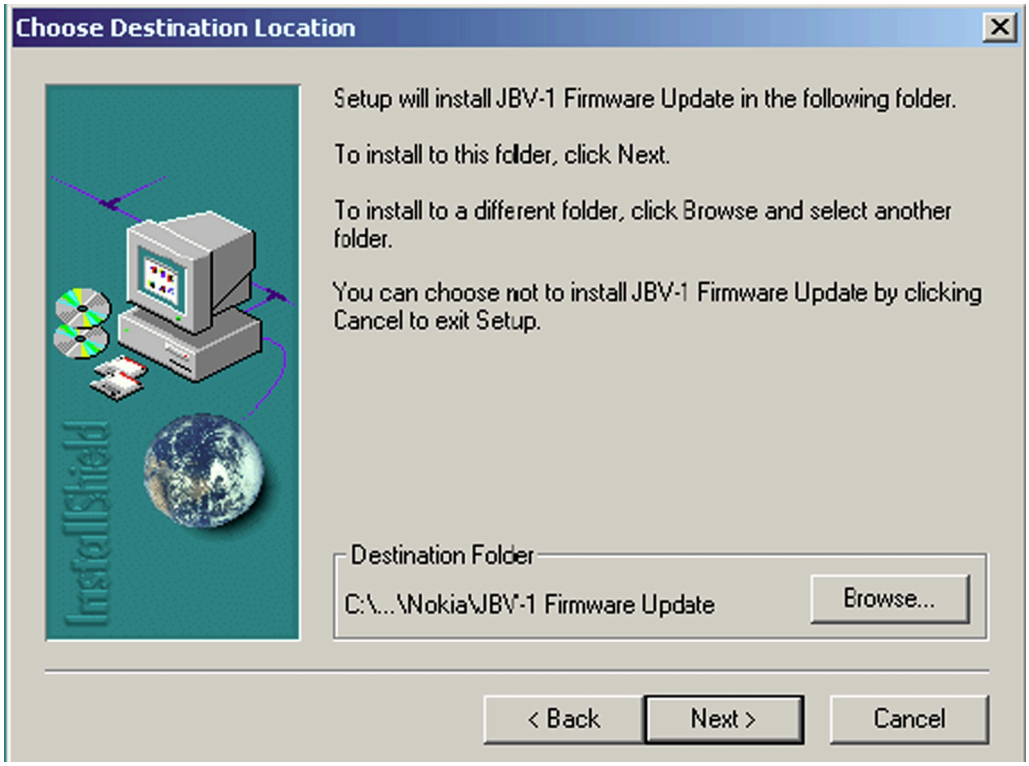

Figure 63 JBV-1 update destination folder

4. Select **Full installation** and click **Next** to continue.

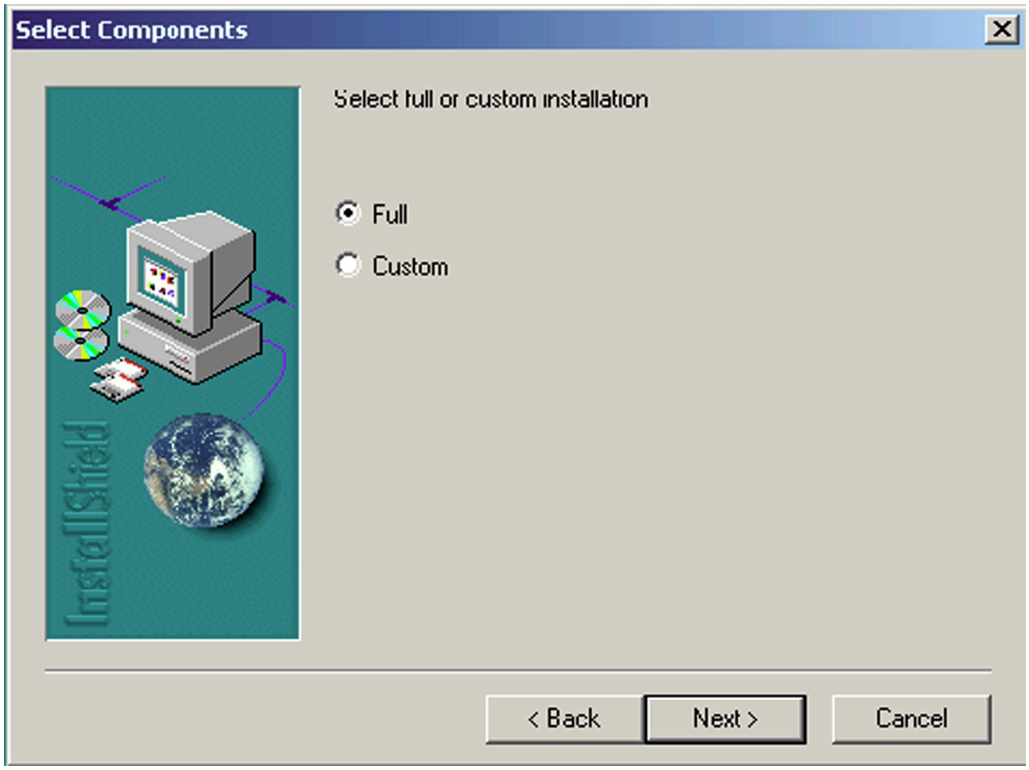

Figure 64 Select installation: Full

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5. A program folder is created and the software files are installed there. Click **Next** to continue.

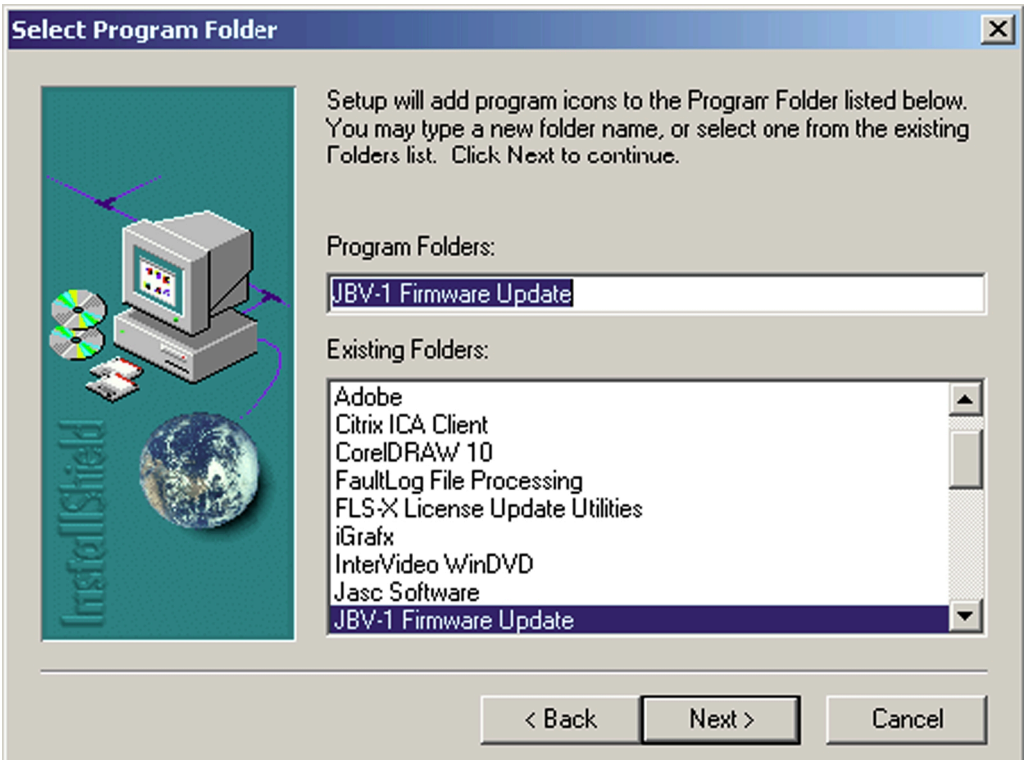

Figure 65 Select program folder

6. Click **Finish** to complete the installation.

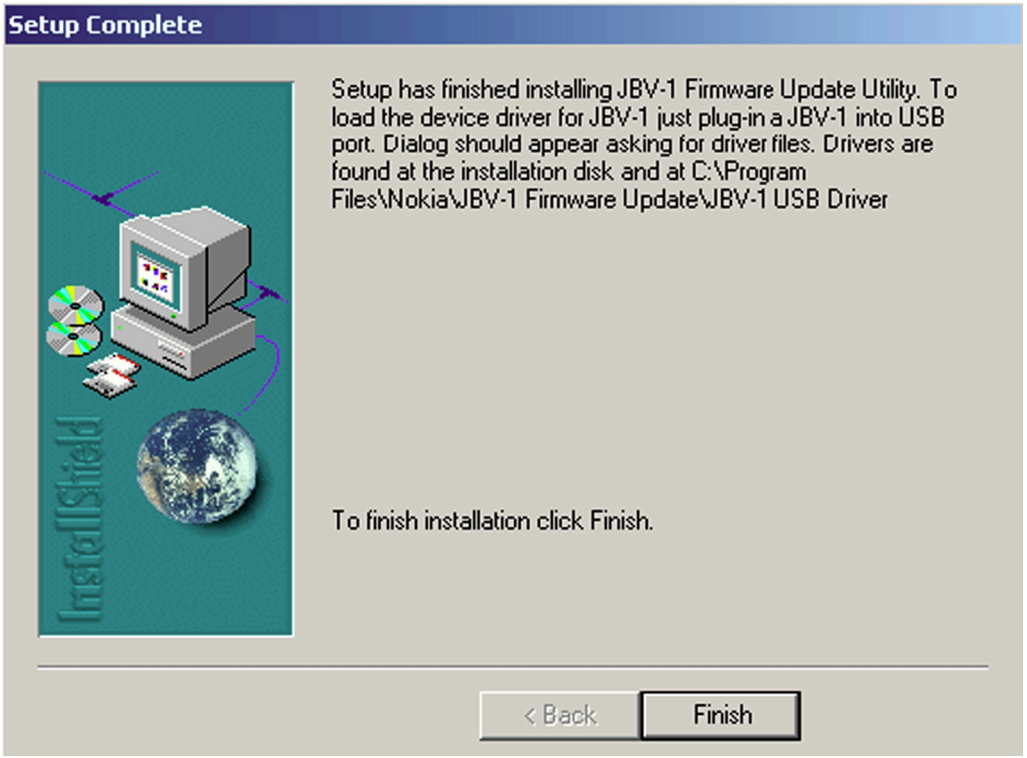

Figure 66 Finish JBV-1 update installation

7. Connect the USB cable/JBV-1 to your computer. Connect power to JBV-1 (11-16V DC) from an external power supply, then connect the USB Cable between the JBV-1 USB connector and the PC.

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8. Install or update the JBV-1 USB drivers which are delivered with the JBV-1 SW installation package.

   The drivers can be found in *C:|Program Files|Nokia| JBV-1 Firmware Update|JBV-1USB driver*

   - If there is no previously installed JBV-1 Firmware update package installed on your computer, Windows will detect connected USB cable and detect drivers for new HW. You will be prompted about this, please follow the instructions and allow Windows to search and install the best drivers available.
   - If there is a previously installed JBV-1 Firmware update package (v.17 or older) on your computer, please update the JBV-1 USB driver. Please see the *readme.txt* file in *C:|Program Files|Nokia|JBV-1 Firmware Update|JBV-1USB driver* folder for instructions on how to update the JBV-1 USB Driver.

   After you have installed or updated the JBV-1 USB driver, the actual JBV-1 SW update can begin.

9. Go to folder *C:|Program Files|Nokia|JBV-1 Firmware Update|JBV-1 Firmware Update* and start JBV-1 Update SW by double clicking *fwup.exe*.

   JBV-1 Firmware update starts and shows current status of the connected JBV-1. If firmware version read from your JBV-1 is not the latest one available (v.17 or older), it needs to be updated to version 18 by clicking **Update Firmware**.

10. Choose **Refresh Status** to check the SW version.

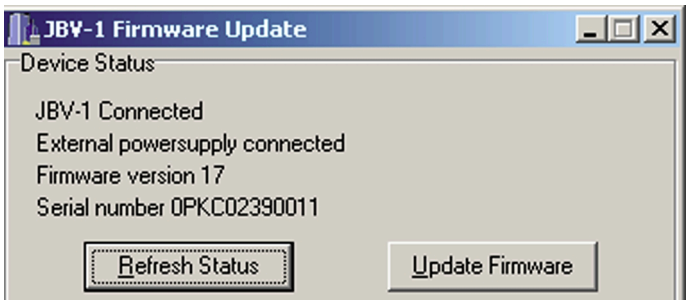

Figure 67 Checking JBV-1 SW version

11. Choose file **JBV1v18.CDE** and click **Open** to update your JBV-1 to a new version (v.18).

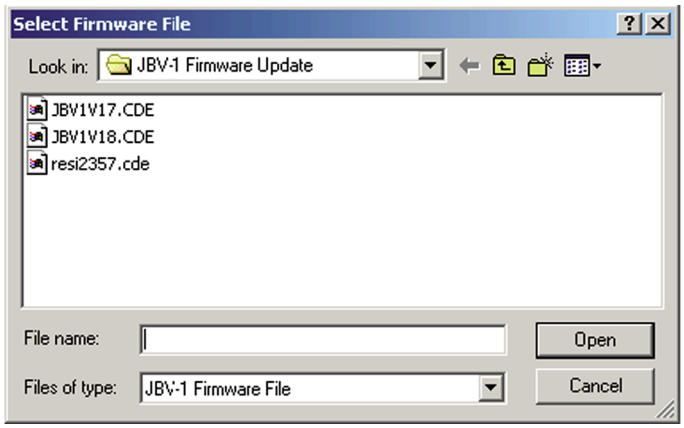

Figure 68 JBV-1 update directory window

Wait until you hear a "click" from the JBV-1.

The older SW file *JBV1v17.CDE* is visible in this view only if the previous JBV-1 SW package has been installed on your computer.

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12. Click OK to see the current JBV-1 status (after a successful update).

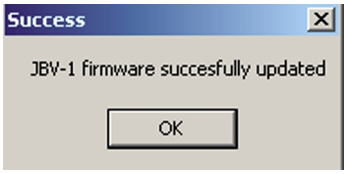

Figure 69 JBV-1 SW update done

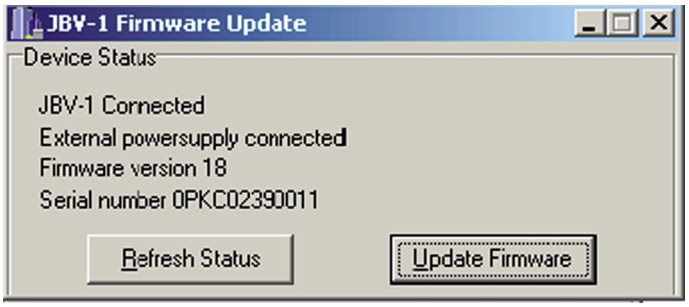

Figure 70 JBV-1 SW status

You have now updated the software of your JBV-1 docking station and it is ready for use.

Next actions

If you have several docking stations you need to update, disconnect the power and USB cables from the previous one and connect them to the next docking station. First, click **Refresh Status** to see the current SW version and then **Update Firmware** to update the software.

After you have updated all docking stations, close the *JBV-1 Firmware Update* dialog box.

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4 — Service Tools

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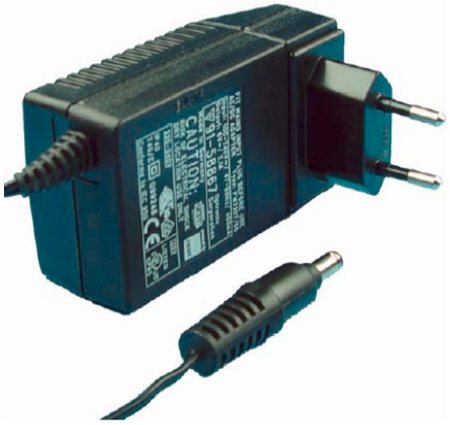
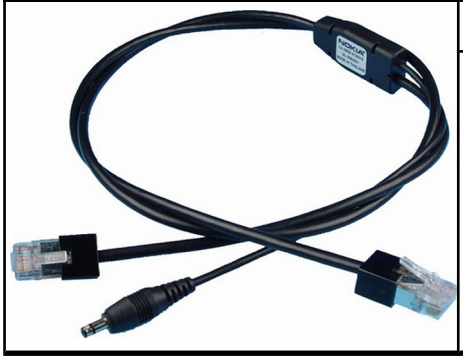
Service tools

The table below gives a short overview of service tools that can be used for testing, error analysis and repair of product RH-86; RH-87, refer to various concepts.

	ACF-8	Universal power supply	
	ACF-8 universal power supply is used to power FPS-8. ACF-8 has 6V DC and 2.1A output.		
	AXS-4	Service cable	
	The AXS-4 D9-D9 service cable is used to connect two 9 pin D connectors for example between PC and FPS-8. The cable length is 2 meters.		
	CA-10DS	Bi-directional Parallel Cable	
	Bi-Directional parallel cable included in FPS-8 sales pack.		
	CA-28DS	Service data cable	
	The CA-28DS service cable is used to connect FLS-4S to the POS flash adapter for supplying a controlled operating voltage and data connection. **Note:** Old XCS-1 cable can be used as well.		

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	CA-31D	USB cable	
	The CA-31D USB cable is used to connect FPS-10 or FPS-11 to a PC. It is included in the FPS-10 and FPS-11 sales packages.		
	CA-35S	Power cable	
	CA-35S is a power cable for connecting, for example, the FPS-10 flash prommer to the Point-Of-Sales (POS) flash adapter.		
	CA-41PS	Power cable	
	Power cable for connection of e.g. the JBV-1 docking station to the FPS-10 prommer box.		
	CA-5S	DC cable	
	The DC cable CA-5S is used to connect JBV-1 to the phone charger jack for ADC/VCHAR/ICHAR calibration **Note:** Old SCB-3 can be used as well.		

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	CA-65DS	DS easy flash cable	
	The CA-65 DS easy flash cable is used to connect the phone bottom connector to either POS flashing device (FLS-4S) or to the PROMMER box (FPS-11).		
	CA-66DS	Easy flash cable	
	This cable connects the phone DC port to the FPS-8 prommer.		
	CA-67DS	Easy flash cable	
	This cable connects the phone DC port to the FPS-10 prommer.		
	DA-49	Docking station adapter	
	The Docking Station adaptor is used for this phone in combination with JBV-1. The adapter supports flashing and energy management calibration. Features include: • compatible with the JBV-1 • easy phone attachment and detachment. • reliable phone locking • switch for detecting phone • replaceable SIM interface		
	DAU-9S	MBUS cable	
	The MBUS cable DAU-9S has a modular connector and is used, for example, between the PC's serial port and module jigs, flash adapters or docking station adapters. **Note:** Docking station adapters valid for DCT4 products.		

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FLC-2	DC cable	
FLC-2 is used with a flash adapter to supply a controlled operating voltage.		

FLS-4S	Flash device	
FLS-4S is a dongle and flash device incorporated into one package, developed specifically for POS use.		

FPS-10	Flash prommer	

FPS-10 interfaces with:

- PC
- Control unit
- Flash adapter
- Smart card

FPS-10 flash prommer features:

- Flash functionality for BB5 and DCT-4 terminals
- Smart Card reader for SX-2 or SX-4
- USB traffic forwarding
- USB to FBUS/Flashbus conversion
- LAN to FBUS/Flashbus and USB conversion
- Vusb output switchable by PC command

FPS-10 sales package includes:

- FPS-10 prommer
- Power Supply with 5 country specific cords
- USB cable

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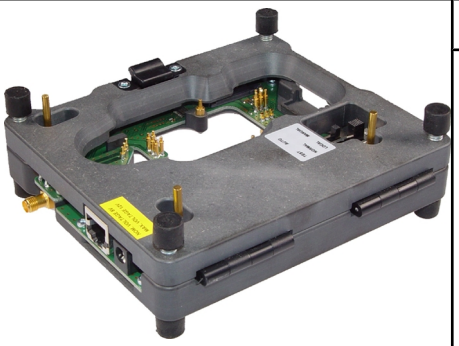
JBV-1	Docking station	

The JBV-1 docking station is a general tool that has been designed for calibration and software update use. The JBV-1 is used together with a docking station adapter as one unit

In calibration mode the JBV-1 is powered by an external power supply: 11-16V DC. When flashing the power for the phone must be taken from the flash prommer.

Note: JBV-1 main electrical functions are:

- adjustable VBATT calibration voltage, current measurement limit voltage: VCHAR, current measurement: ICHAR
- adjustable ADC calibration voltage via BTEM and the BSI signal
- BTEMP and BSI calibration resistor
- signal from FBUS to the phone via the parallel jig
- control via FBUS or USB
- Flash OK/FAIL indication



MJ-59	Module jig	

MJ-59 is meant for component level troubleshooting.

The jig includes an RF interface for GSM.

PCS-1	Power cable	

The PCS-1 power cable (DC) is used with a docking station, a module jig or a control unit to supply a controlled operating voltage.

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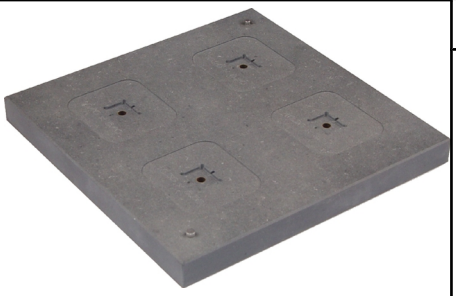
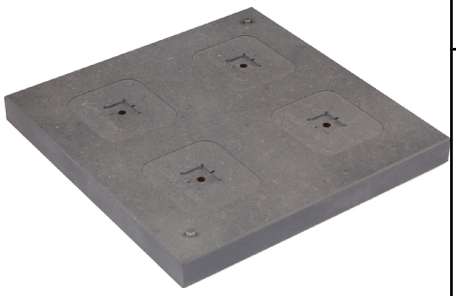
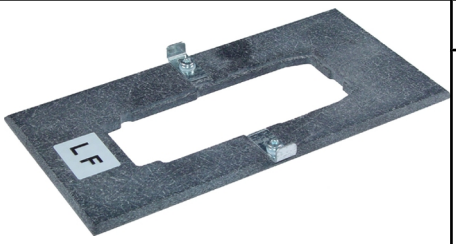
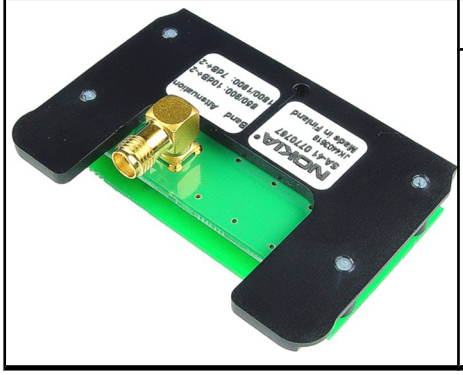
	PKD-1	SW security device	
	SW security device is a piece of hardware enabling the use of the service software when connected to the parallel (LPT) port of the PC. Without the device, it is not possible to use the service software. Printer or any such device can be connected to the PC through the device if needed.		
	RJ-51 PA	Rework jig	
	To be used with ST-30!		
	RJ-72	Rework jig	
	To be used with rework stencil ST-32.		
	RJ-79	Soldering jig	
	The soldering jig RJ-79 is used for soldering and as a rework jig for system module. It is made of lead-free rework compatible material.		
	SA-41	RF Coupler	
	SA-41 RF Coupler is used for Go/No-Go test after changing components in the RF part of the phone. The SA-41 is mounted on the docking station adapter. **Note:** For RF attenuation values, please refer to the Service bulletin.		

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	SF-10	POS flash adapter	
	The POS flash adapter SF-10 allows FBUS/MBUS connections for flashing.		
	SPS-1	Soldering Paste Spreader	
	SRT-6	Opening tool	
	SRT-6 is used to open phone covers and B-to-B connectors.		
	SS-54	Alignment Jig	
	Alignment jig is used to efficiently assemble the dome-sheet to the pone's PWB. The jig is made of EDS proof material.		

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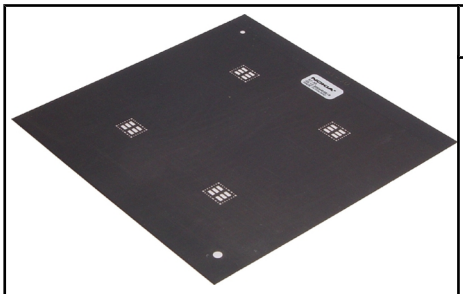	ST-30	Rework stencil	
	Rework stencil to be used together with RJ-51 to rework the Front End Module (FEM)		
	ST-32	Rework stencil for N7600	
	Rework stencil to be used together with RJ-72 for rework of N7600.		
	SX-4	Smart card	
	SX-4 is a BB5 security device used to protect critical features in tuning and testing. SX-4 is also needed together with FPS-10 when DCT-4 phones are flashed.		
	XCS-4	Modular cable	
	XCS-4 is a shielded (one specially shielded conductor) modular cable for flashing and service purposes.		

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	XRF-1	RF cable	
	The RF cable is used to connect, for example, a module repair jig to the RF measurement equipment. SMA to N-Connector ca. 610mm. Attenuation for: • GSM850/900: 0.3+-0.1 dB • GSM1800/1900: 0.5+-0.1 dB • WLAN: 0.6+-0.1dB		

Service concepts

Service concepts

Easy flash concept

1112 RH-93/92
2310 RM-189
2610 RH-86/87

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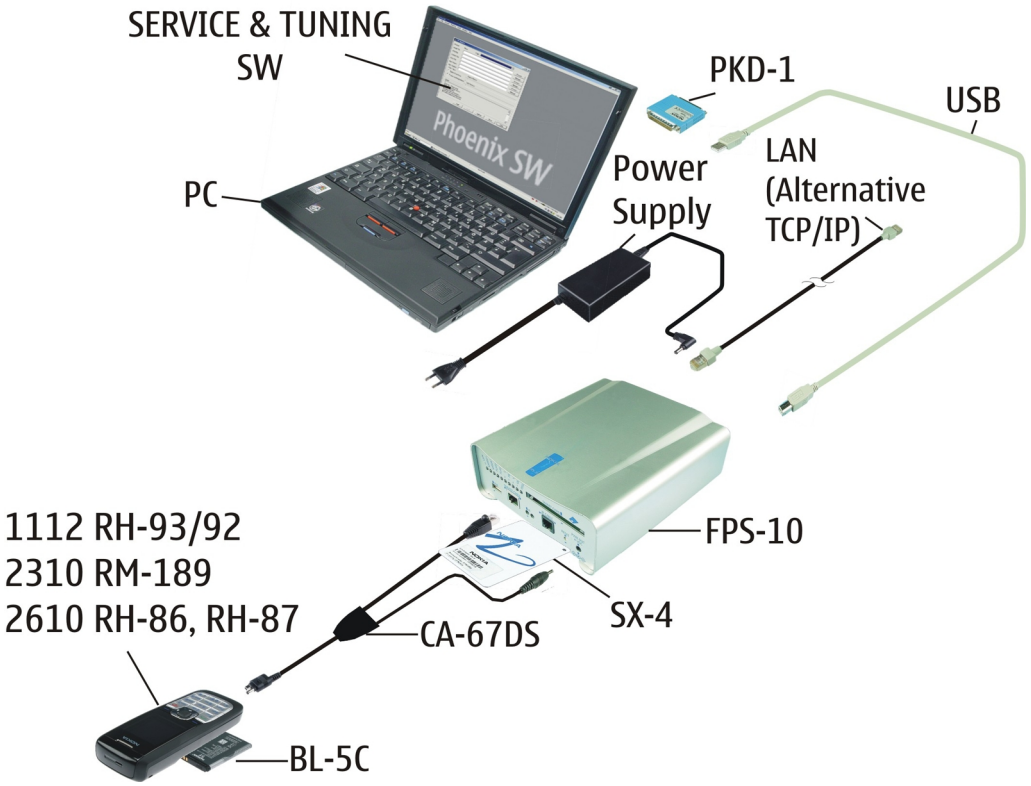
POS flash concept

Flash concept with FPS-10



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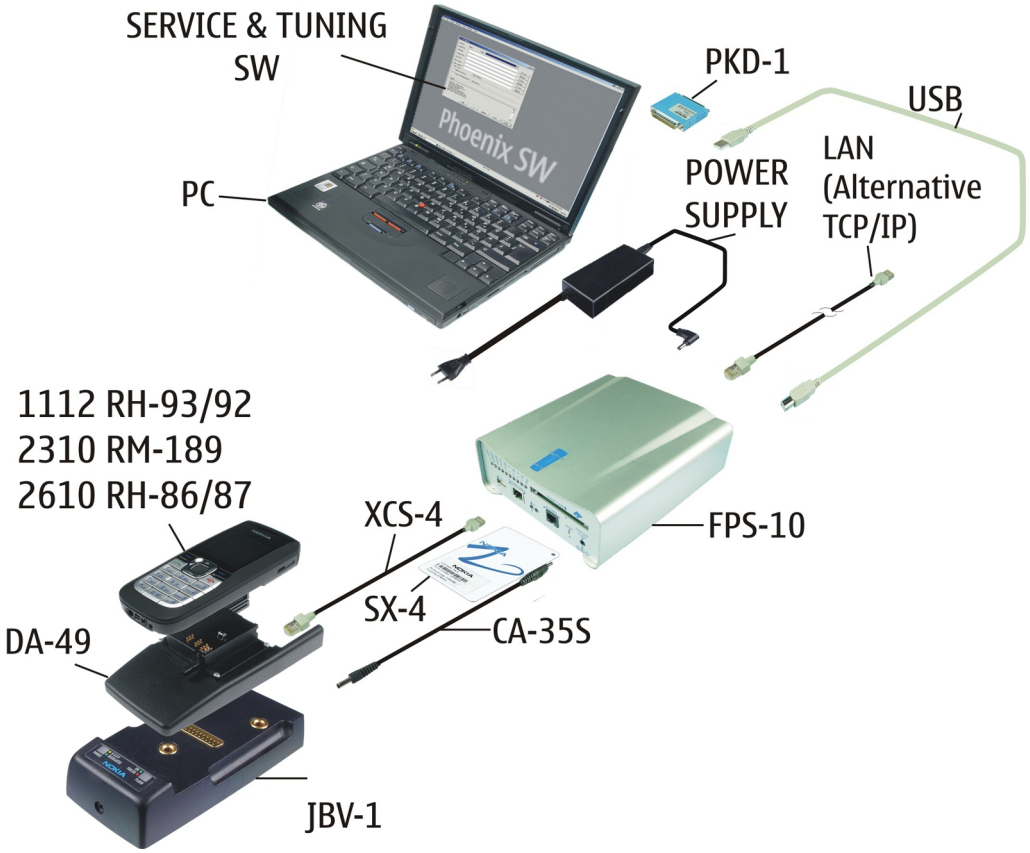
JBV-1 flash concept with FPS-10 and smart card



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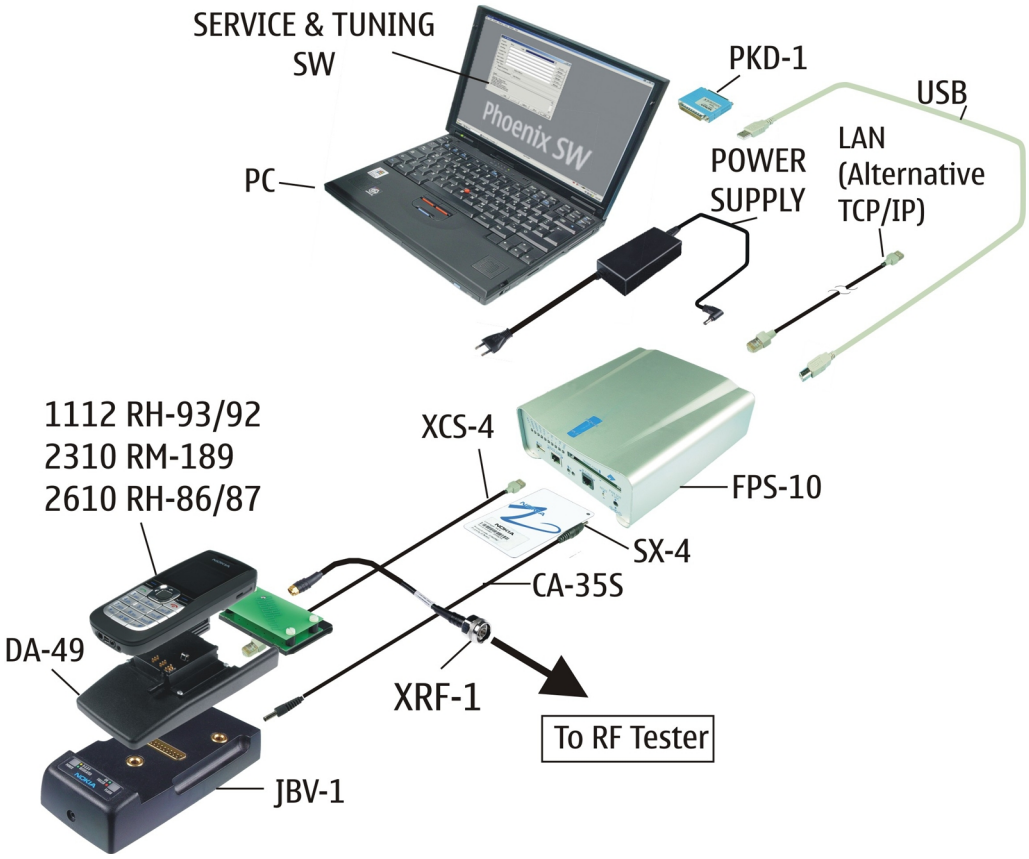
JBV-1 flash concept with FPS-10 and RF tuning



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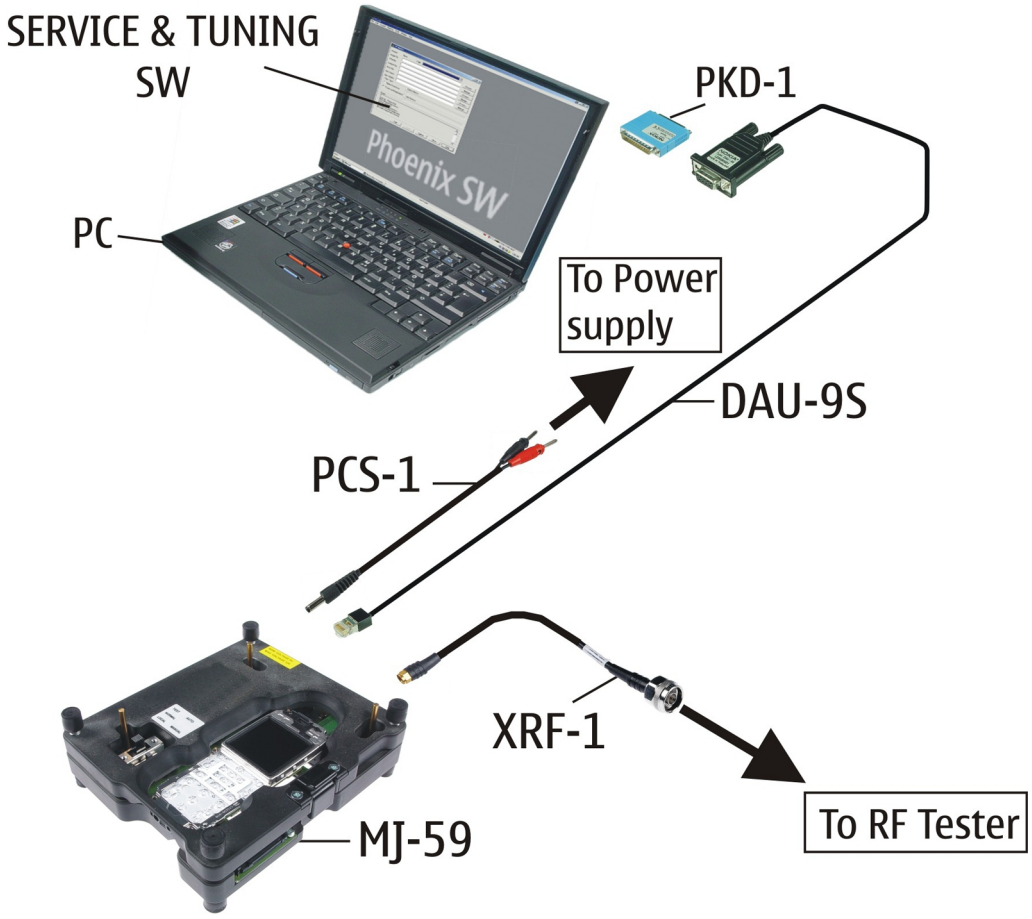
Module jig testing and tuning concept



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5 — Disassembly and reassembly instructions

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Reassembly instructions.....5–10

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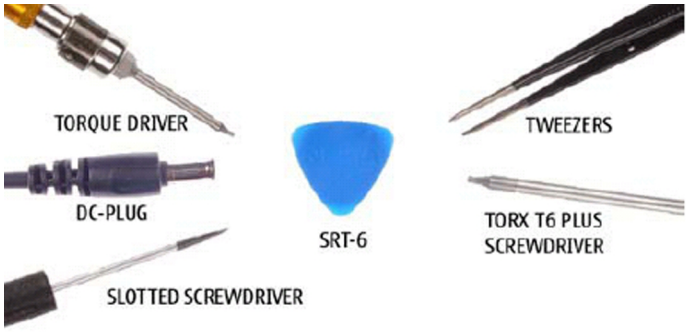
Disassembly instructions

Steps

1. You will need these tools:



2. Protect the window with a film.

3. Remove the **B-cover**.

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4. User the SRT-6 to unlock the **A-cover** on both sides.

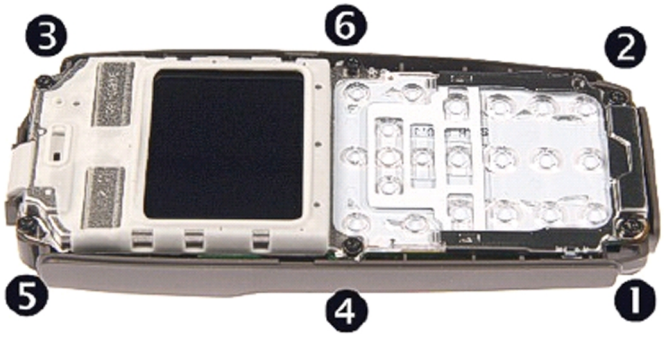
5. Remove the **A-cover**.

   Note: When reassembling the **A-cover**, always start on the top side of the device!

6. Remove the **keymat** and protect the inner side of the window with a film.

7. Unscrew the six Torx Plus size 6 screws in the shown order.

   Note: For assembly, use the reverse order and a Torx Plus size 6 driver with a torque setting of 24 Ncm.



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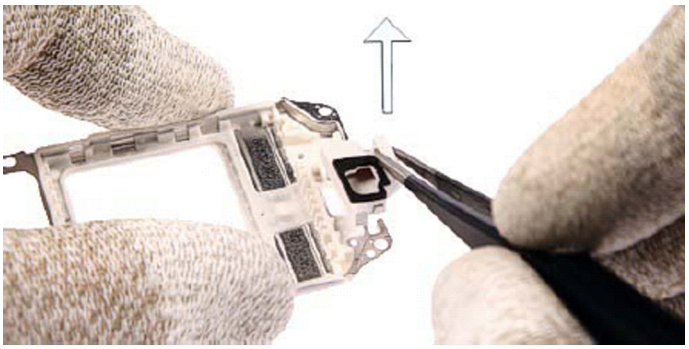
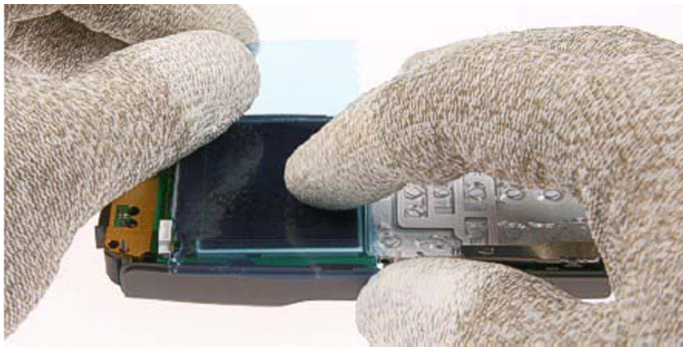
8. Lift the **LCD shieldning** while carefully pressing on the **LCD module** with a clean cloth.

9. Remove the **LCD shielding**.

10. Remove the **Acoustic channel**.



11. Protect the **LCD module** with a film.



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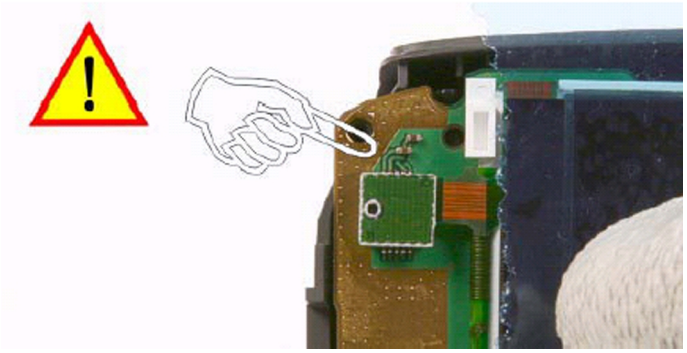
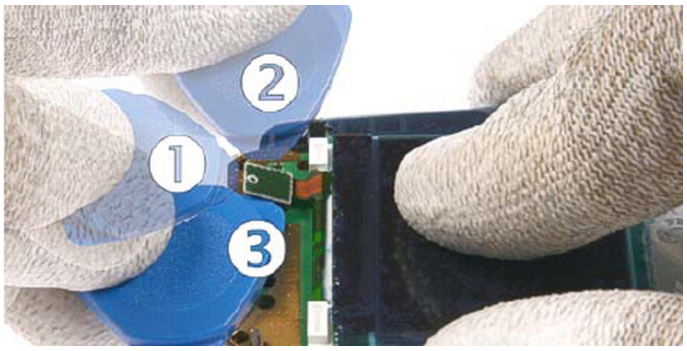
12. Be careful with the surrounding components when opening the LCD connector.

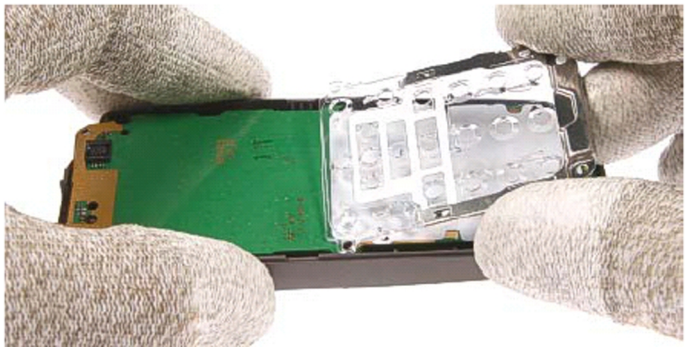


13. Use the SRT-6 to open the LCD connector in the shown order. Be careful with the flex foil of the **LCD module**.



14. Remove the **LCD module**.

15. Remove the **Light guide assembly**.



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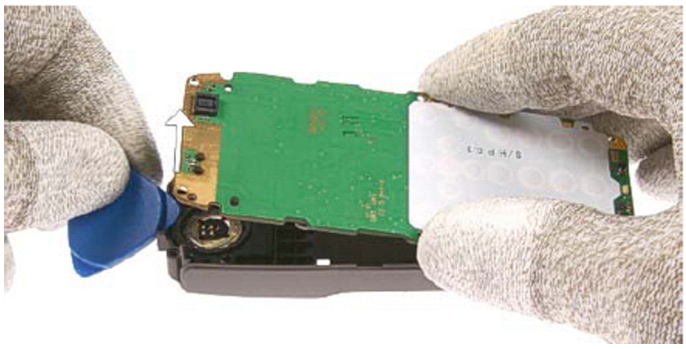
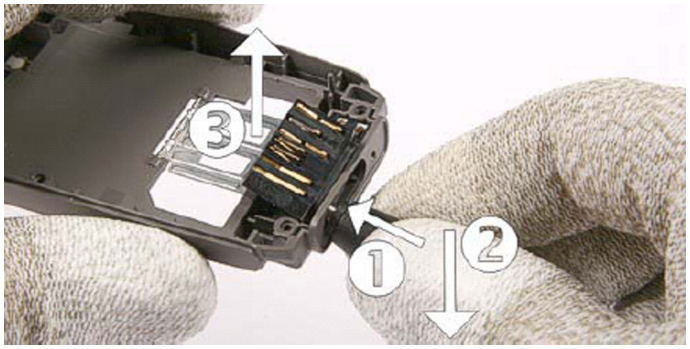
16. Lift the **Engine module** a bit with the SRT-6 and remove it from the **D-cover assembly**.

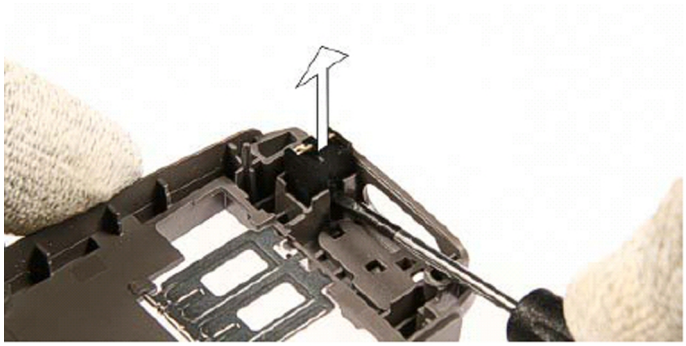


17. The **Antenna IHF assembly** drops out when turning the **D-cover assembly**.

18. Press out the **Easy flash connector** by using the DC-plug.



19. Remove the **Microphone** with the slotted scewdriver



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Reassembly instructions

For reassembly, follow the Disassembly instructions, but *in reversed order*

Note: Pay special attention to step **7** and **5**.

Note: For reassembly, ALWAYS USE NEW SCREWS.

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6 — Baseband troubleshooting

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General baseband troubleshooting

Phone is dead

Context

This means that the phone does not use any current at all when the supply is connected and/or power key is pressed. It is assumed that the voltage supplied is 3.6VDC. The UEMCLite will prevent any functionality at battery/supply levels below 2.9VDC.

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Troubleshooting flow

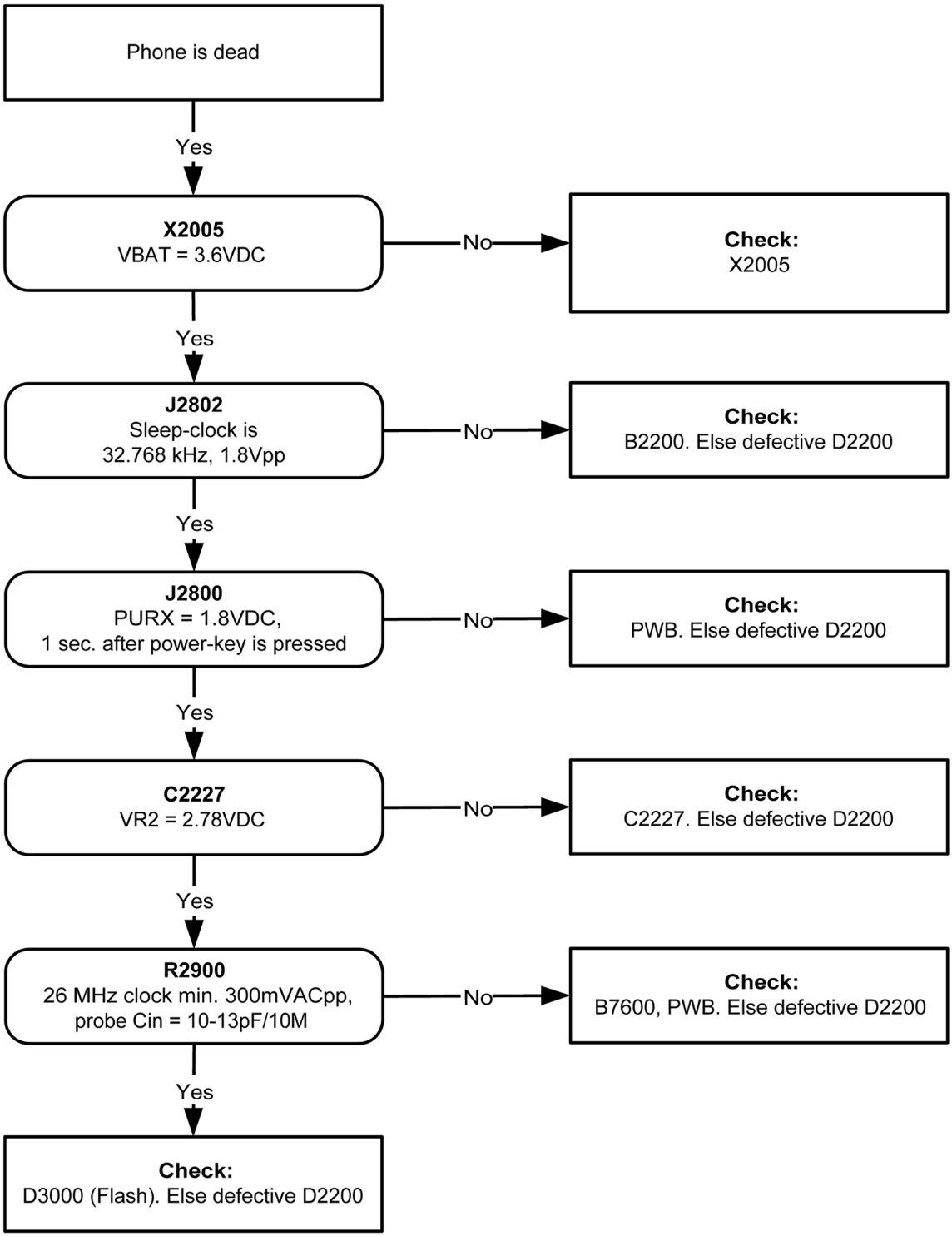

Figure 71 Phone is dead troubleshooting

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Flash programming do not work

Troubleshooting flow

The flash programming can be done via the pads on the PWB (J2060).

In case of Flash failure in FLALI station, swap the phone and send it back to the care program for further analysis. Possible failures could be short-circuit of balls under µBGAs (UEMCLite, UPP4M, FLASH). Missing or misaligned components. In flash programming error cases the flash prommer can give some information about a fault. The fault information messages could be:

Phone doesn't set FBUS_TX line low

Because of the use of uBGA components it is not possible to verify if there is a short circuit in control- and address lines of MCU (UPP4M) and memory (flash).

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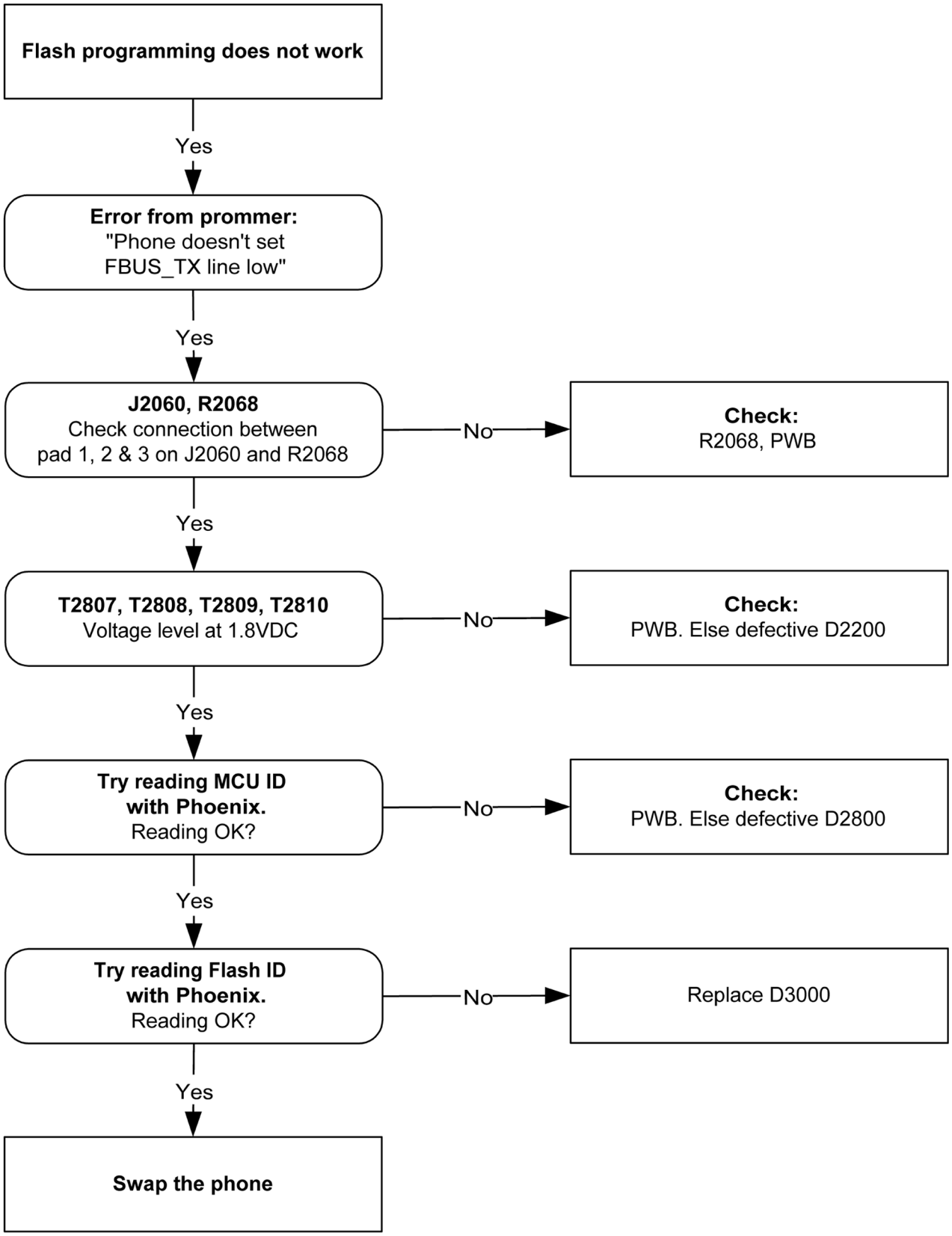

Figure 72 Flash programming fault

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Easy flash programming does not work

Troubleshooting flow

The flash programming can also be done via the easy flash connector.

In case of Flash failure in FLALI station, swap the phone and send it back to the care program for further analysis. Possible failures could be short-circuit of balls under µBGAs (UEMCLite, UPP4M, FLASH). Missing or misaligned components.

In flash programming error cases the flash prommer can give some information about a fault. The fault information messages could be:

- Phone does not set FBUS_TX line low

Because of the use of uBGA components it is not possible to verify if there is a short circuit in control- and address lines of MCU (UPP4M) and memory (flash).

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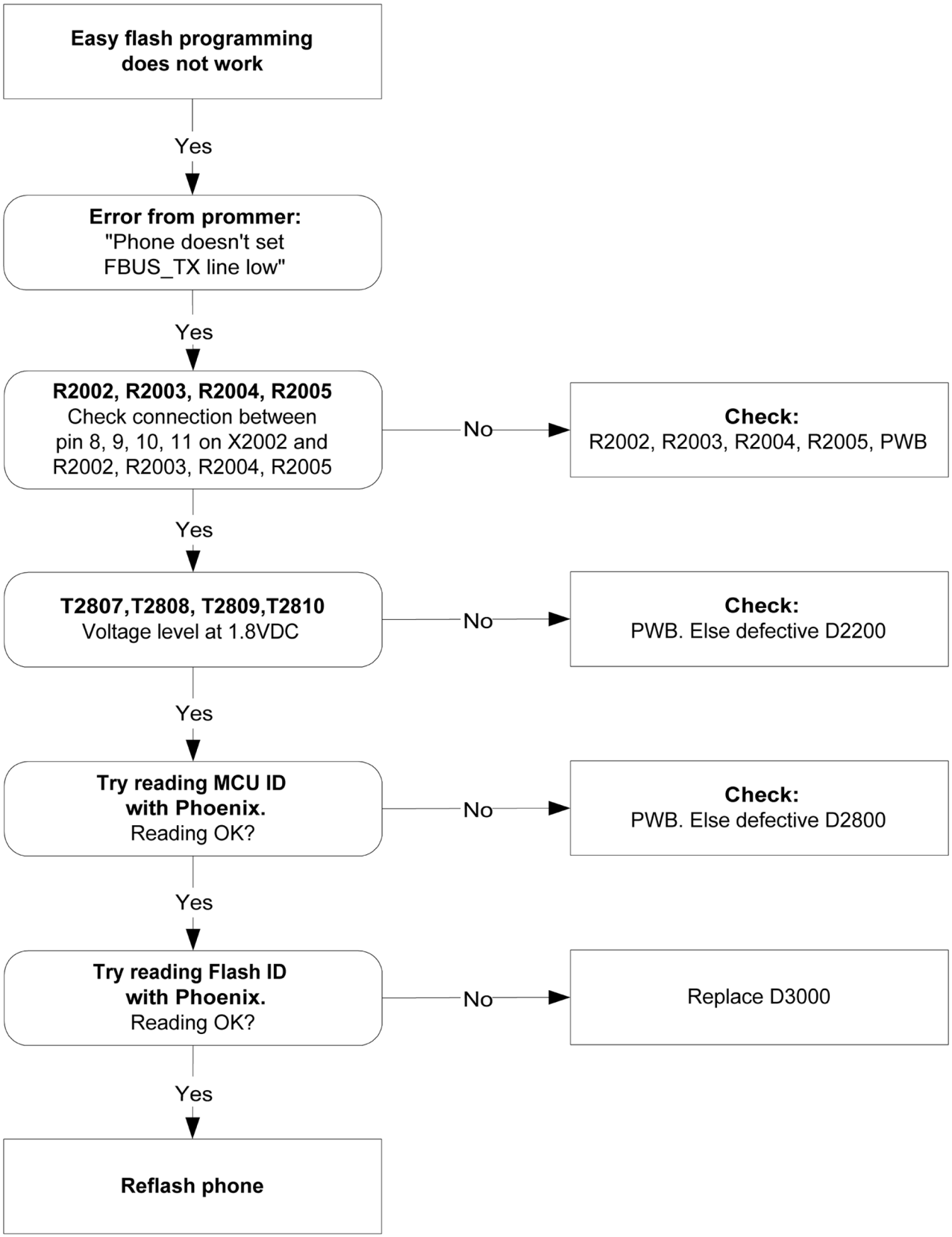

Figure 73 Easy flash programming fault

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Power does not stay on or the phone is jammed

Troubleshooting flow

If this kind of a failure is presenting itself immediately after FLALI, it is most likely caused by ASIC's missing contact with PWB.

If the MCU doesn’t service the watchdog register within the UEMCLite, the operations watchdog will run out after approximately 32 seconds. Unfortunately, the service routine can not be measured.

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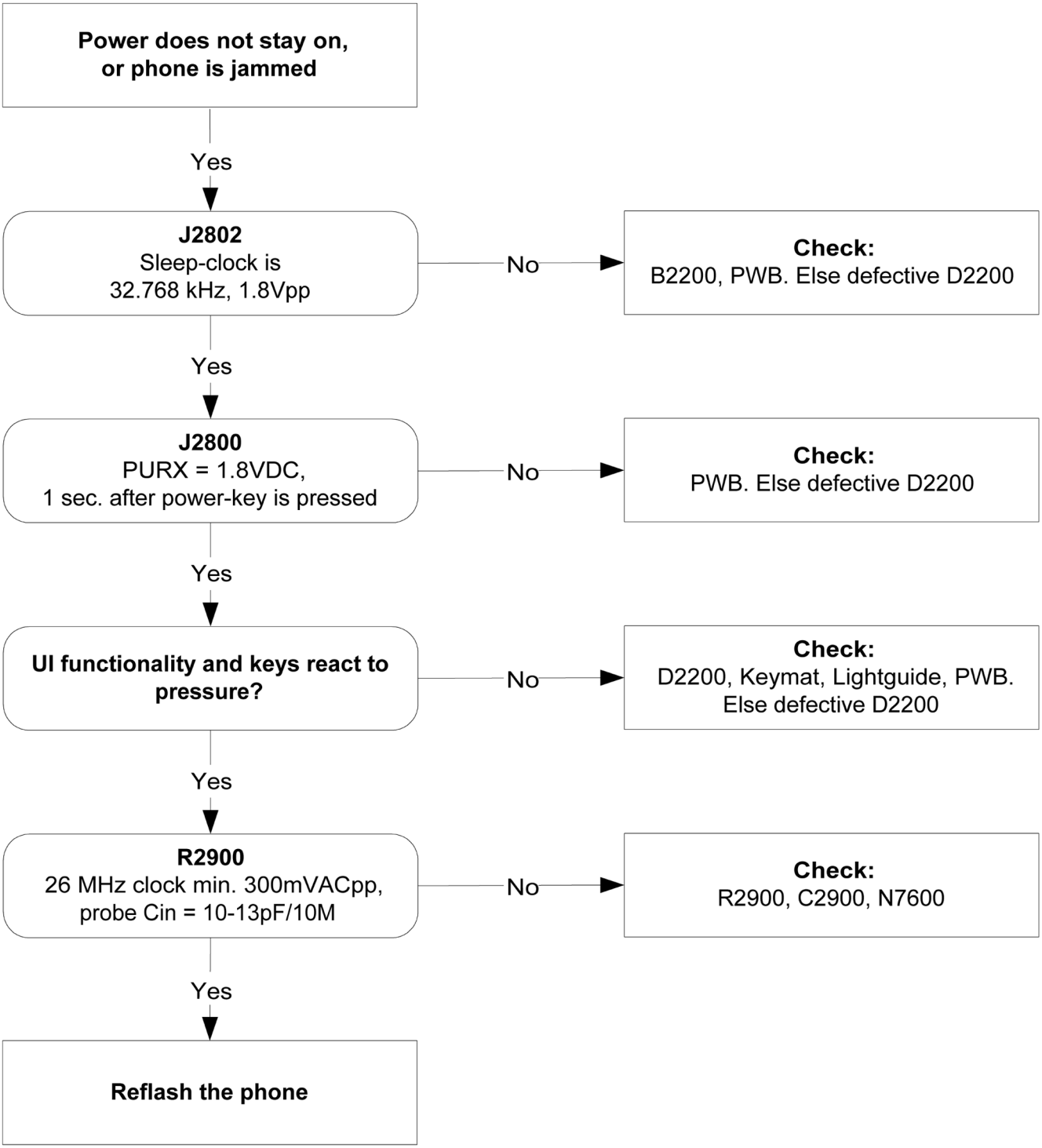

Figure 74 Power does not stay on or the phone is jammed

Display shows "Contact Service"

Troubleshooting flow

This error can only happen at power up where several self-tests is run. If any of these test cases fails the display will show the message: "Contact Service".

It's individual test cases so the below lineup of error hunting's has no chronological order. Use common sense and experience to decide which test case to start error hunting at.

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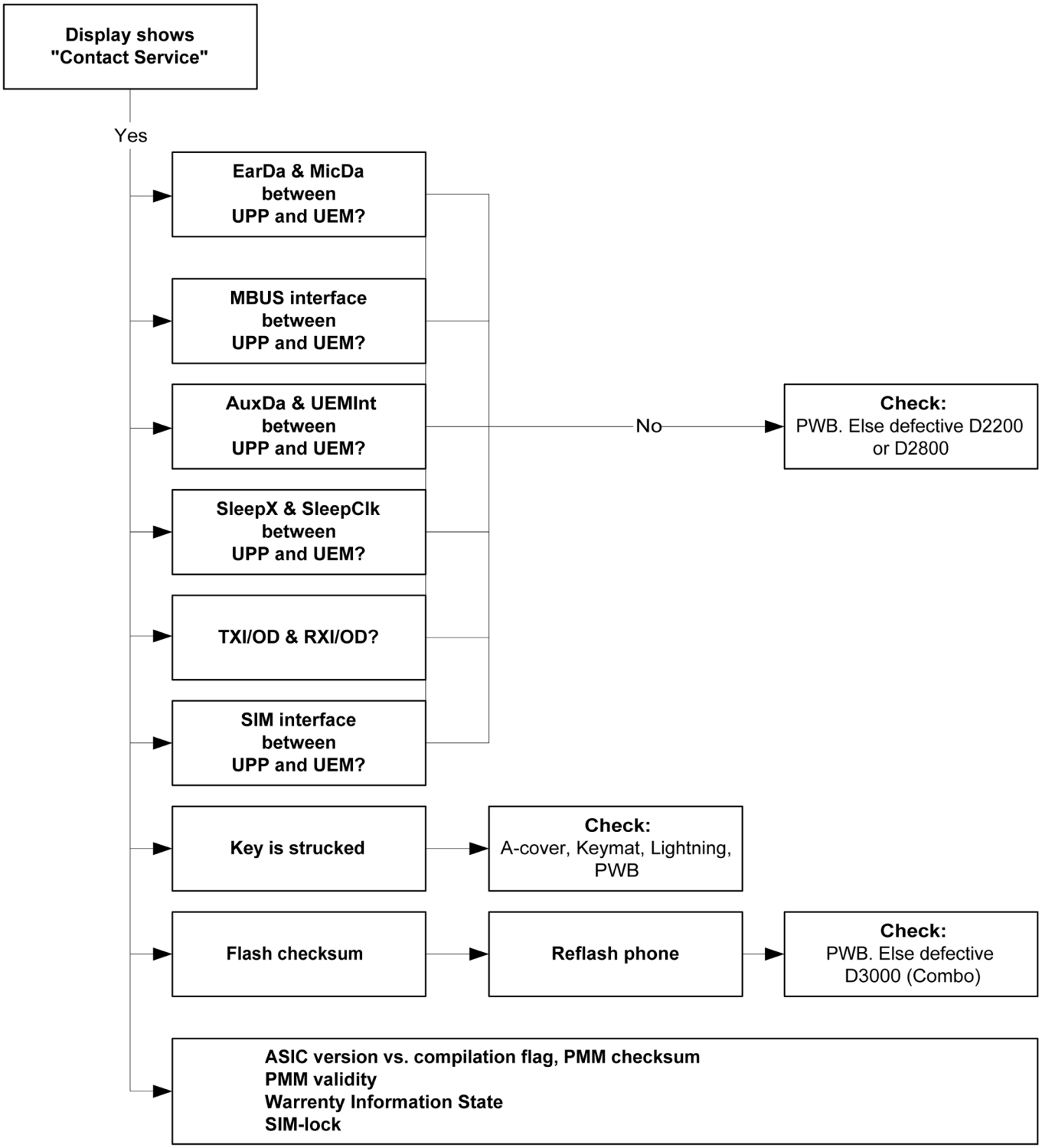

Figure 75 Troubleshooting when the "Contact Service" message is seen

The phone does not register to the networks, or the phone can not make a call

Troubleshooting flow

If the phone doesn't register to the network, the fault can be in either BB or RF. Only few signals can be tested since several signals is 'buried' in one or more of the inner layers of the PWB.

First of all check that SIM LOCK is not causing the error by using a Test-SIM card and connect the phone to a tester.

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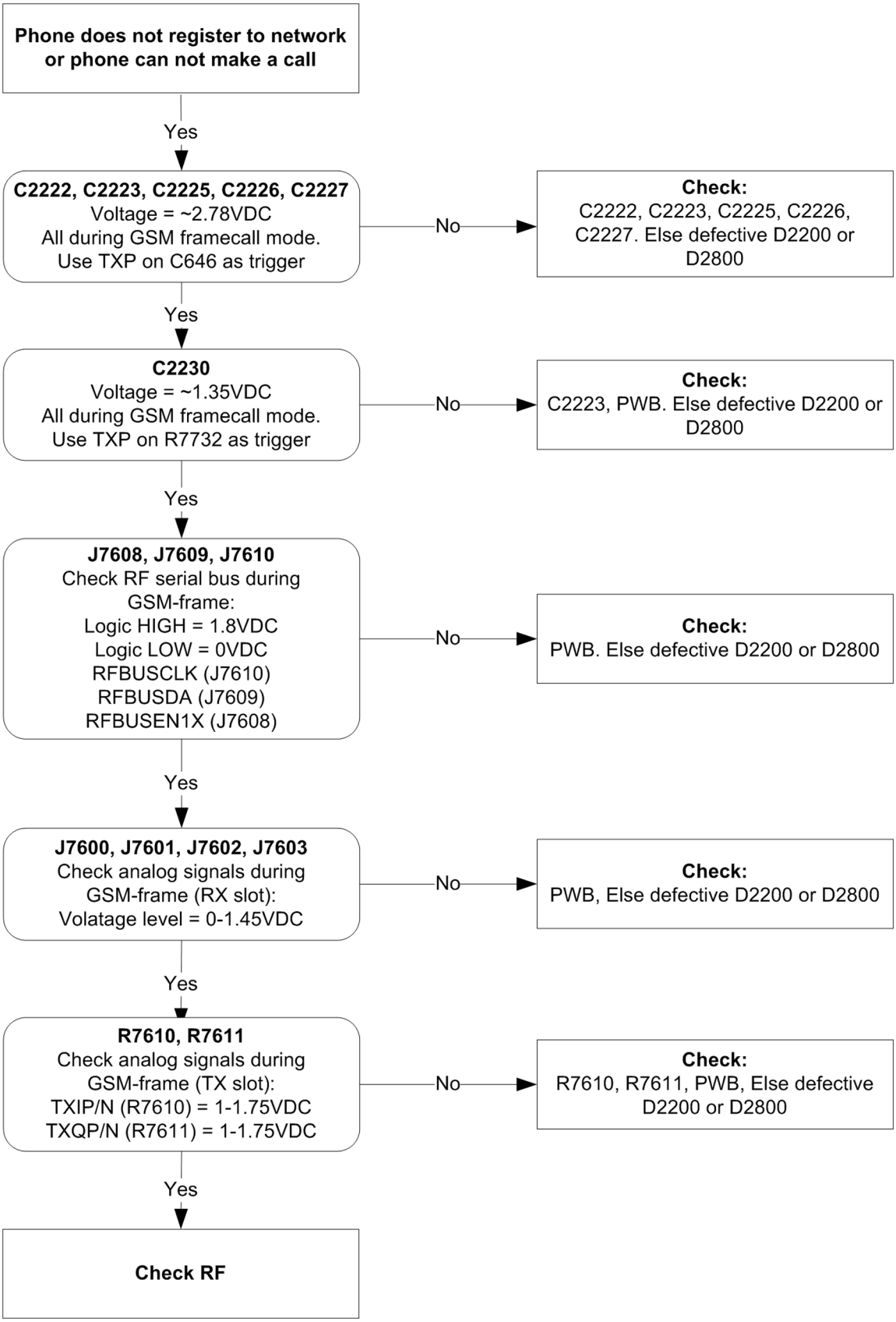

Figure 76 No registering or call

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SIM related faults

Insert SIM card fault

Troubleshooting flow

The hardware of the SIM interface from UEMCLite (D2200) to the SIM connector (X2700) can be tested without a SIM card. When the power is switched on the phone first check for a 1.8SIM card and then a 3V SIM card. The phone will try this four times, where after it will display ”Insert SIM card”.

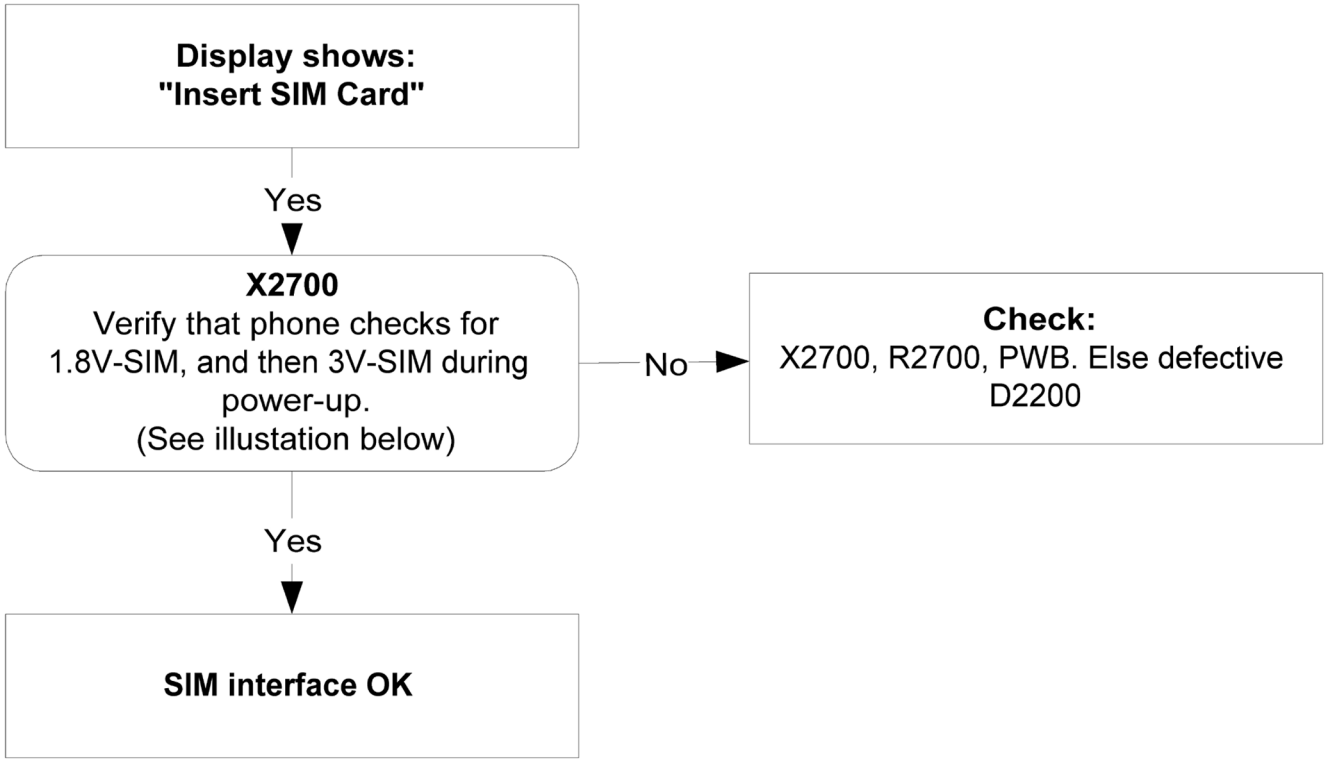

Figure 77 Insert SIM card fault

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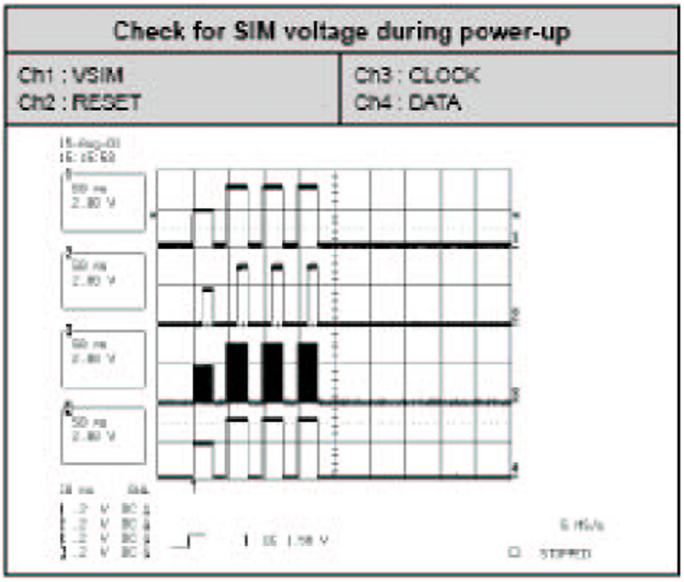

Figure 78 Signal diagram

SIM card rejected

The error "SIM card rejected" means that the ATR message received from SIM card is corrupted, e.g. data signal levels are wrong. The first data is always ATR and it is sent from card to phone.

For reference a picture with normal SIM power-up is shown below.

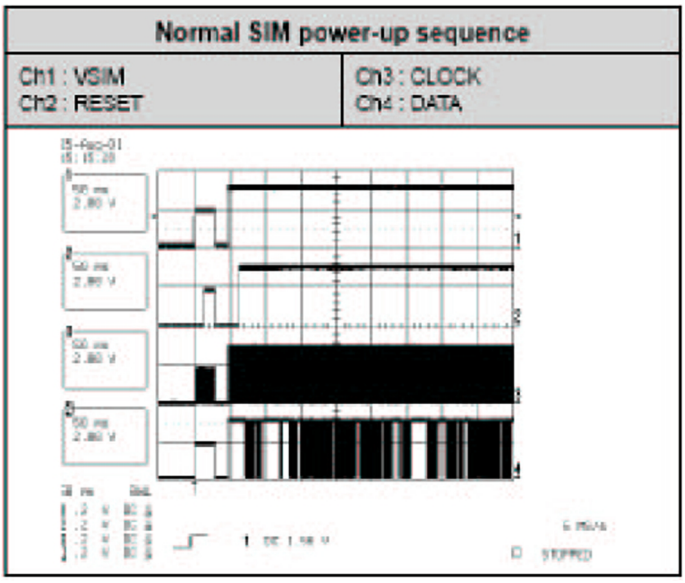

Figure 79 Signal diagram

User interface

Blank display

Troubleshooting flow

The display does not show any information at all.

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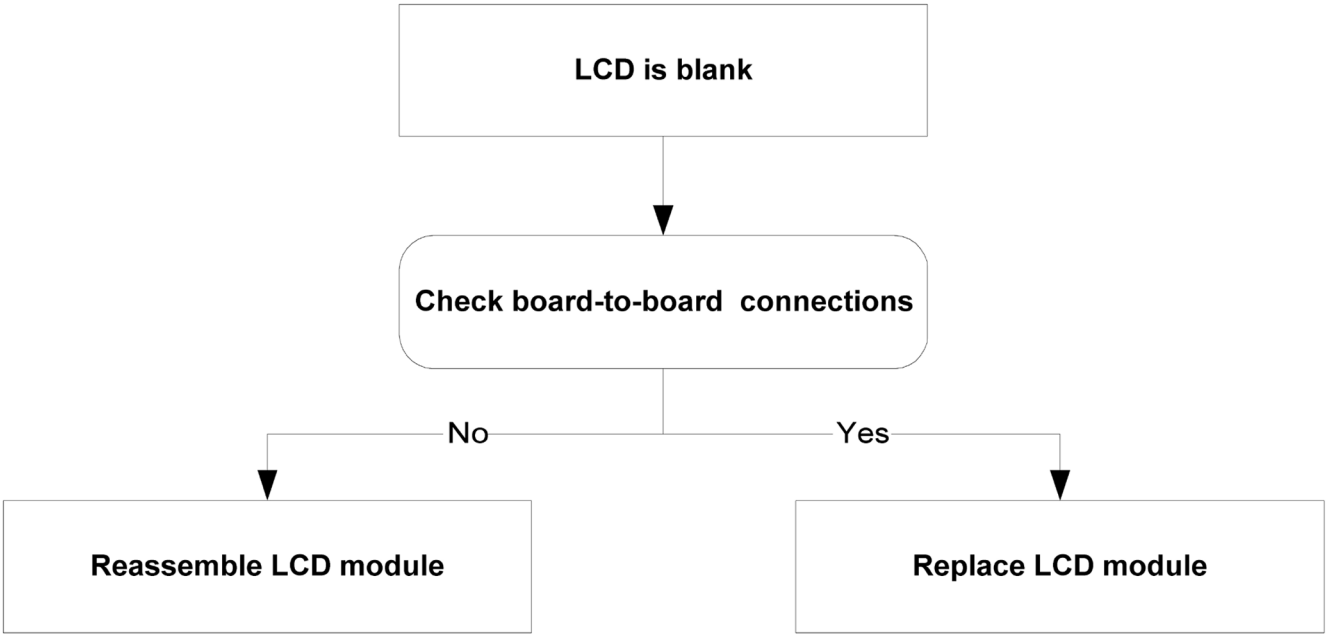

Figure 80 Blank display

Display is corrupt

The display contains missing or fading segments or color presentation is incorrect.

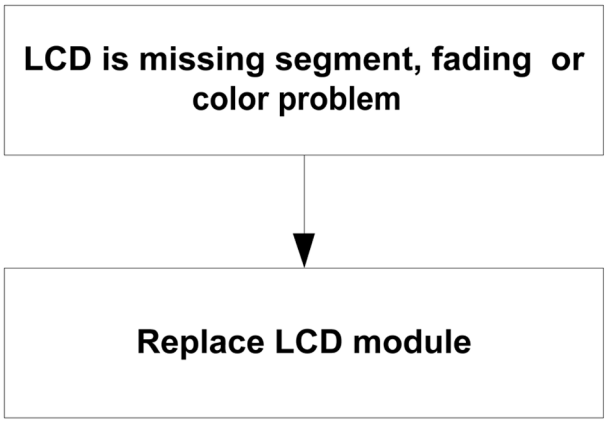

Figure 81 Display is corrupt

Dead keys

Not a single key is responding.

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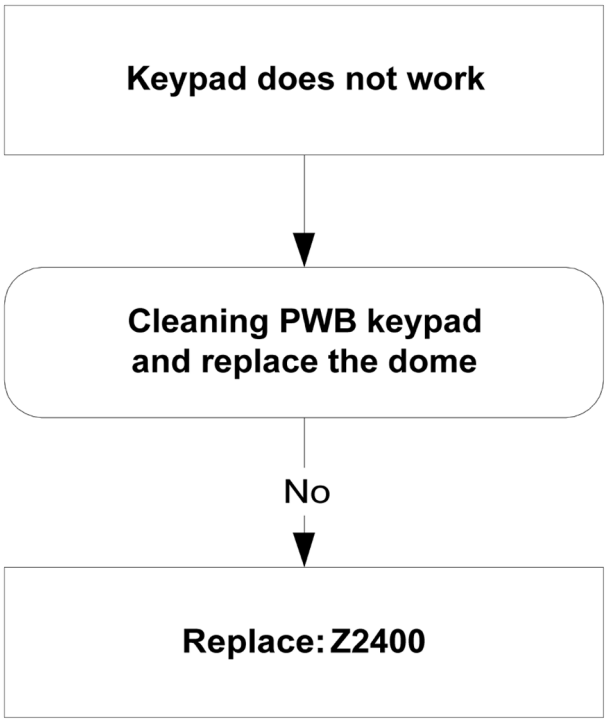

Figure 82 Dead keys

No backlight for display or keys

Troubleshooting flow

There is no backlight on the display or on the keys.

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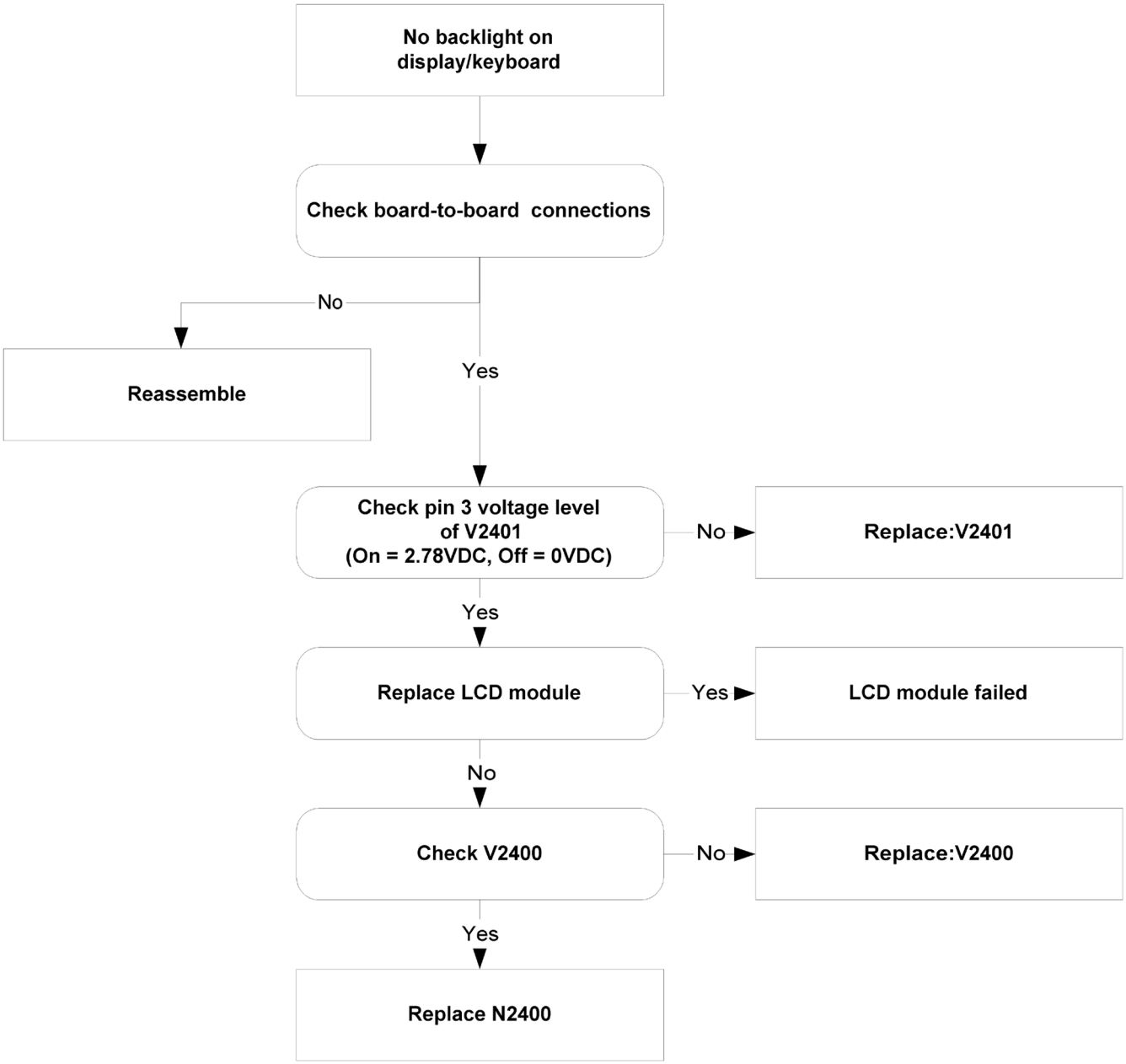

Figure 83 No backlight for display or keys

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Audio troubleshooting

Audio troubleshooting using phoenix

Troubleshooting flow

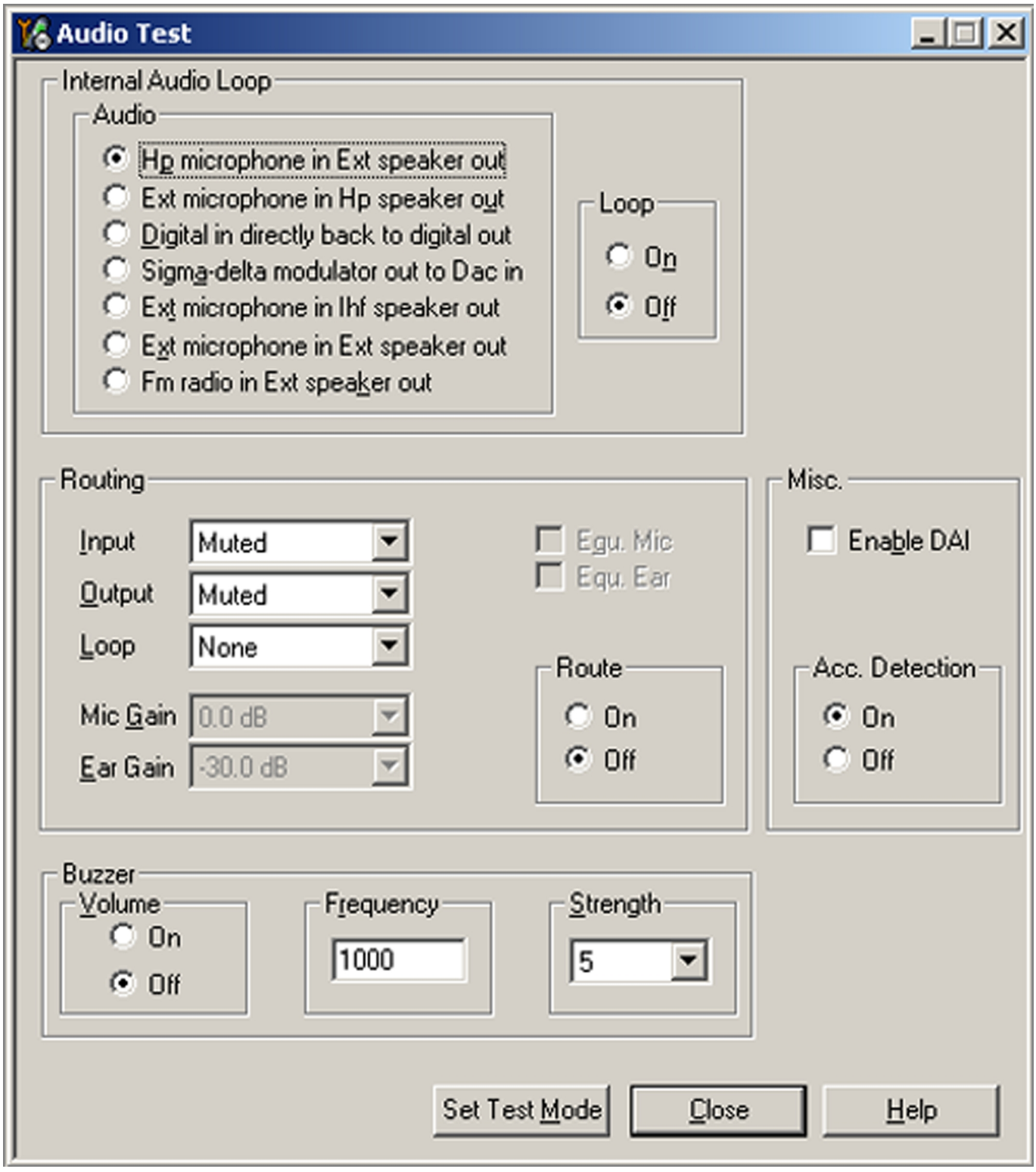

Figure 84 Phoenix audio test window

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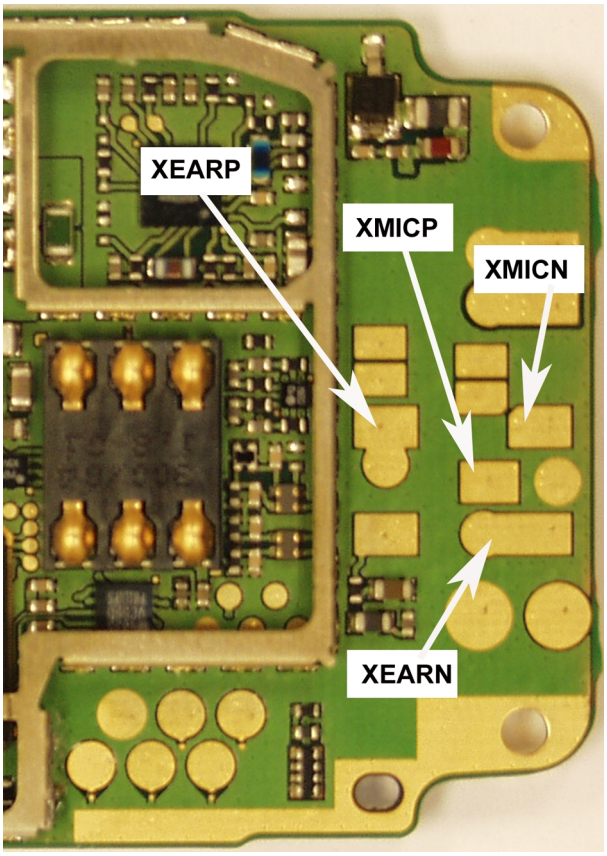

Figure 85 PWB audio test points

Check microphone using "Hp microphone in Ext speaker out" loop

Steps

1. Connect phone with Phoenix.
2. Open “audio test” window from “Testing -> Audio test”, as shown in *Figure Phoenix audio test window* above.
3. Select “Hp microphone in Ext speaker out”
4. Select "Acc. Detection" as "Off".
5. Select “Loop” as “On”
6. Input sound at microphone port, for example 94 dB SPL 1 kHz.
7. Check if signal is detected at XEARP/N pads, shown in *Figure PWB audio test points* above.

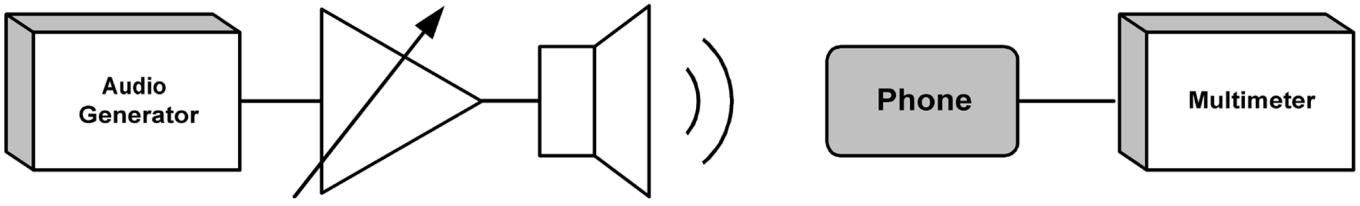

Figure 86 Test arrangement for microphone

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Check earpiece using "Ext microphone in Hp speaker out" loop

Steps

1. Connect phone with Phoenix.
2. Open “audio test” window from “Testing -> Audio test”, as shown in *Figure Phoenix audio test window* above.
3. Select “Ext microphone in Hp speaker out”
4. Select “Loop” as “On”
5. Input signal to XMICP/N pads, as shown in *Figure PWB audio test points* above, for example 100 mVpp, 1 kHz.
6. Check if sound is heard in earpiece.

Troubleshooting flow

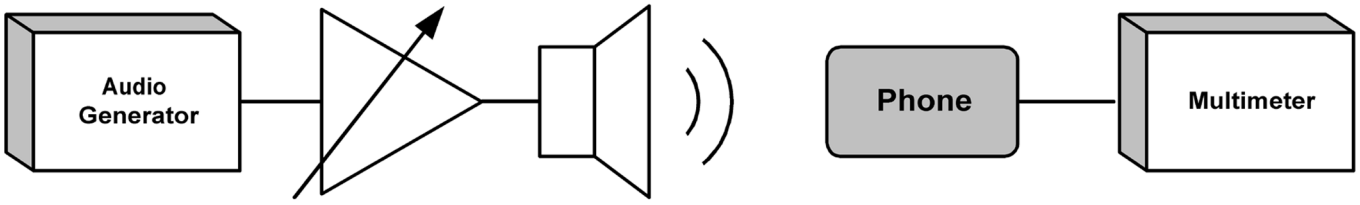

Figure 87 Test arrangement for earpiece

Check IHF & ringing tone function using "Buzzer"

Steps

1. Connect phone with Phoenix.
2. Open “audio test” window from “Testing -> Audio test”, as shown in *Figure Phoenix audio test window* above.
3. In “Buzzer” area, select suitable signal to be played, for example 1 kHz, Strength 5”
4. Select “Volume” as “On”
5. Check if sound is heard in IHF.

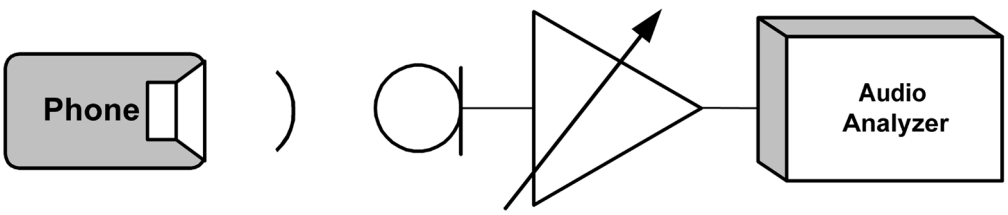

Figure 88 Checking IHF and ring tone by using "Buzzer"

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Check vibra function using "Vibra control"

Steps

1. Connect phone with Phoenix.
2. Open “Vibra control” window from “Testing -> Vibra control”, as shown in the figure below.
3. Select suitable intensity value, for example 53 %.
4. Select “Vibra state” as “Enabled”
5. Click “Write”.
6. Check if Vibra works.

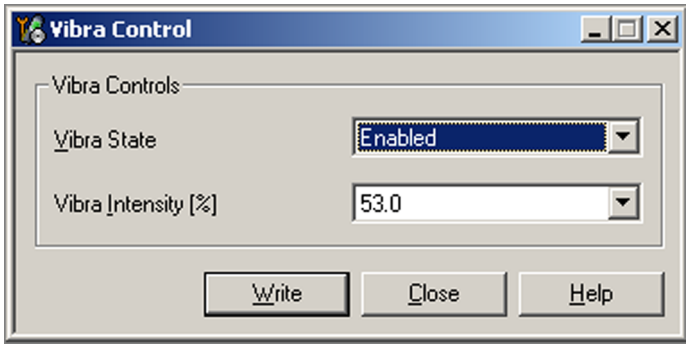

Figure 89 Checking vibra function by using vibra control

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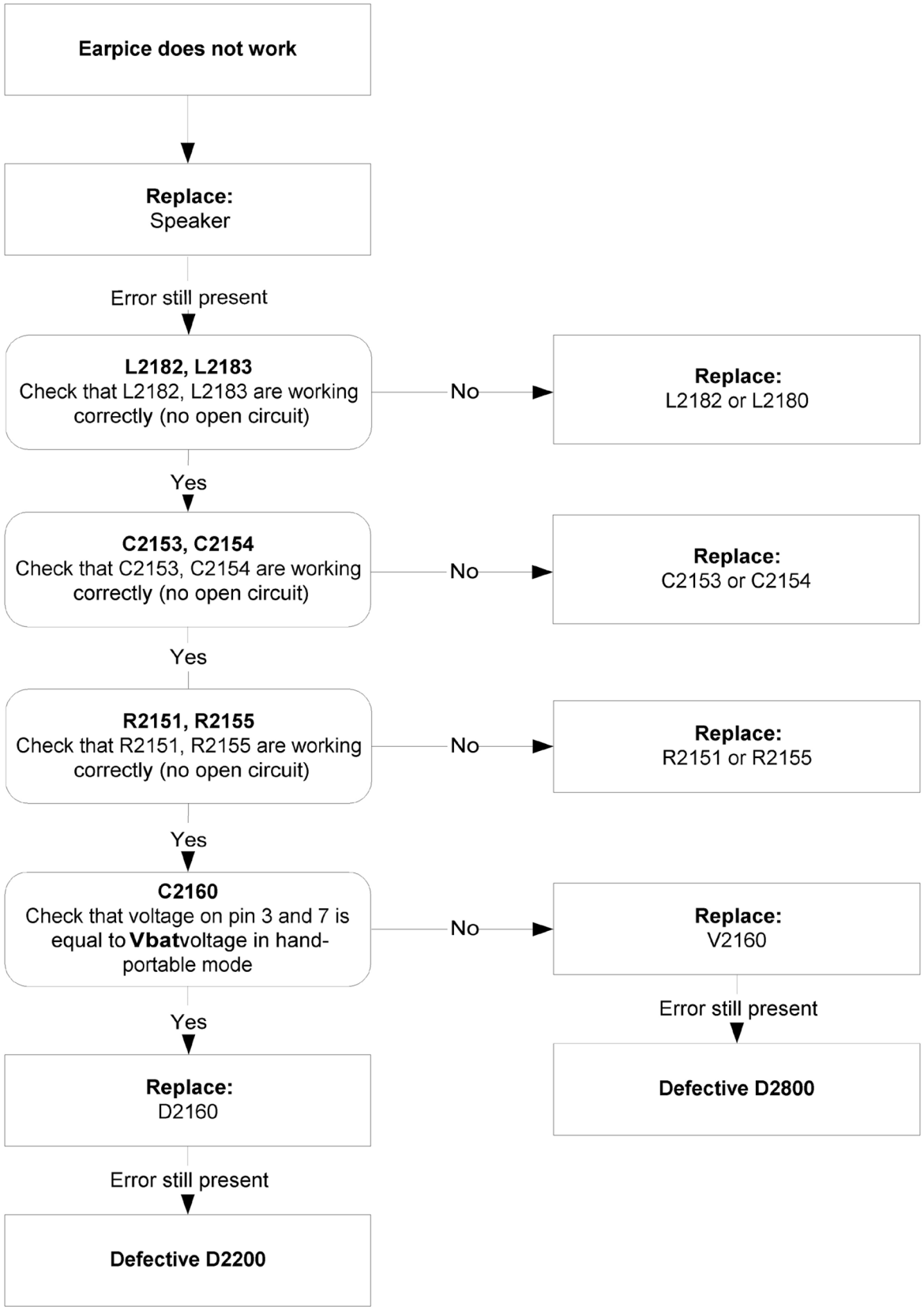
Earpiece fault

Troubleshooting flow



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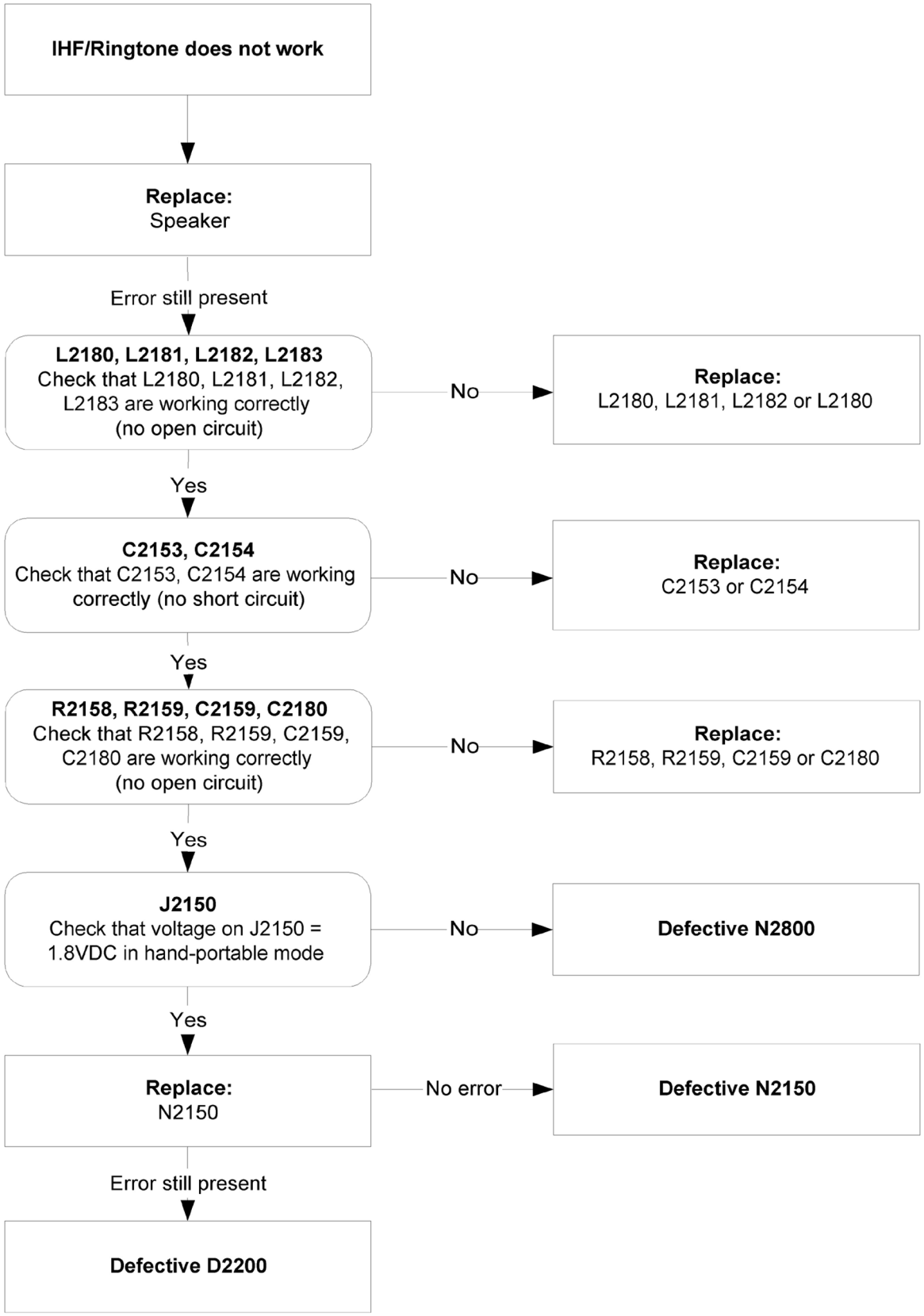
IHF/ringing tone fault

Troubleshooting flow



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Headset earpiece fault

Troubleshooting flow

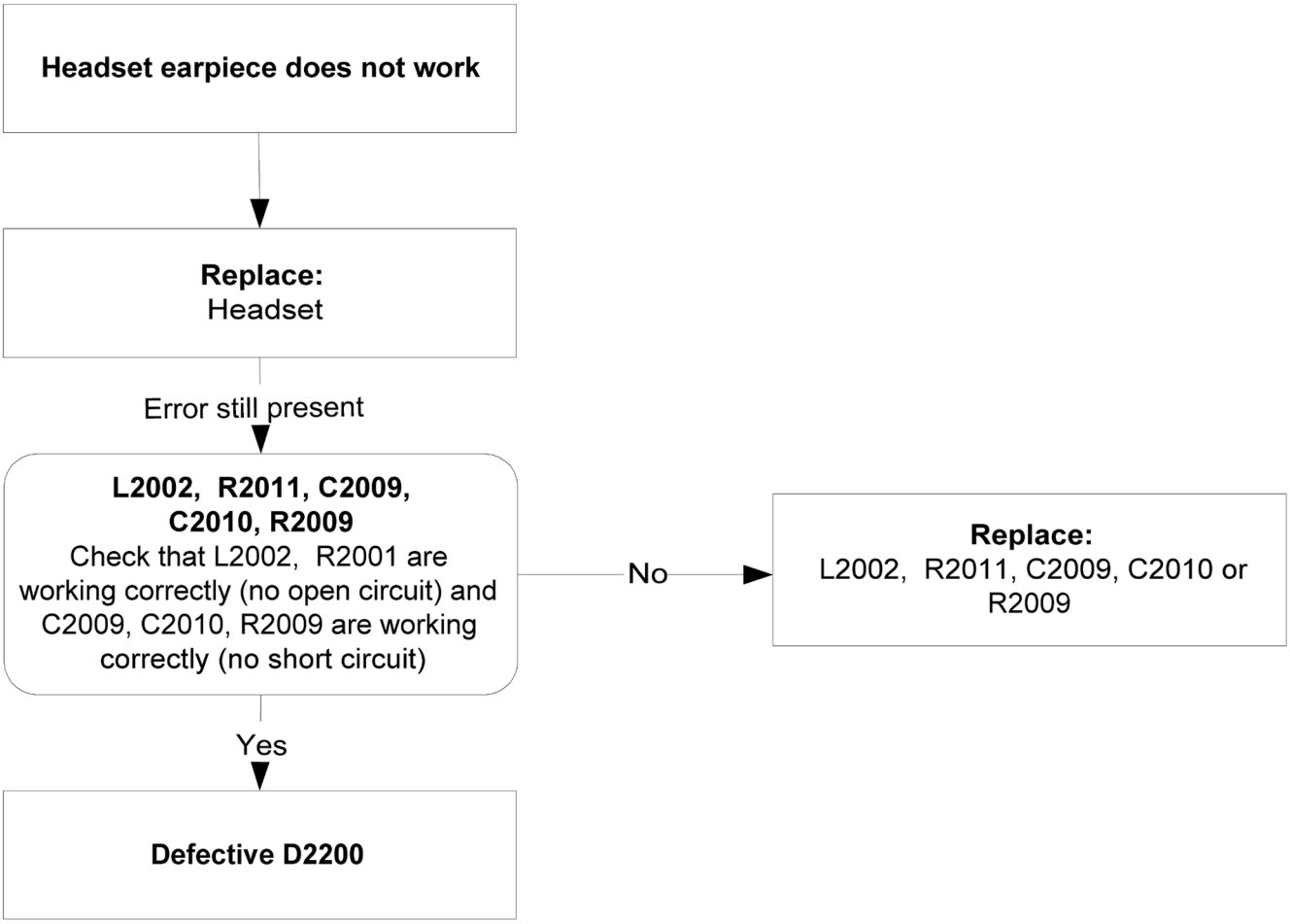

Figure 90 Headset earpiece fault flow chart

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Microphone fault

Troubleshooting flow

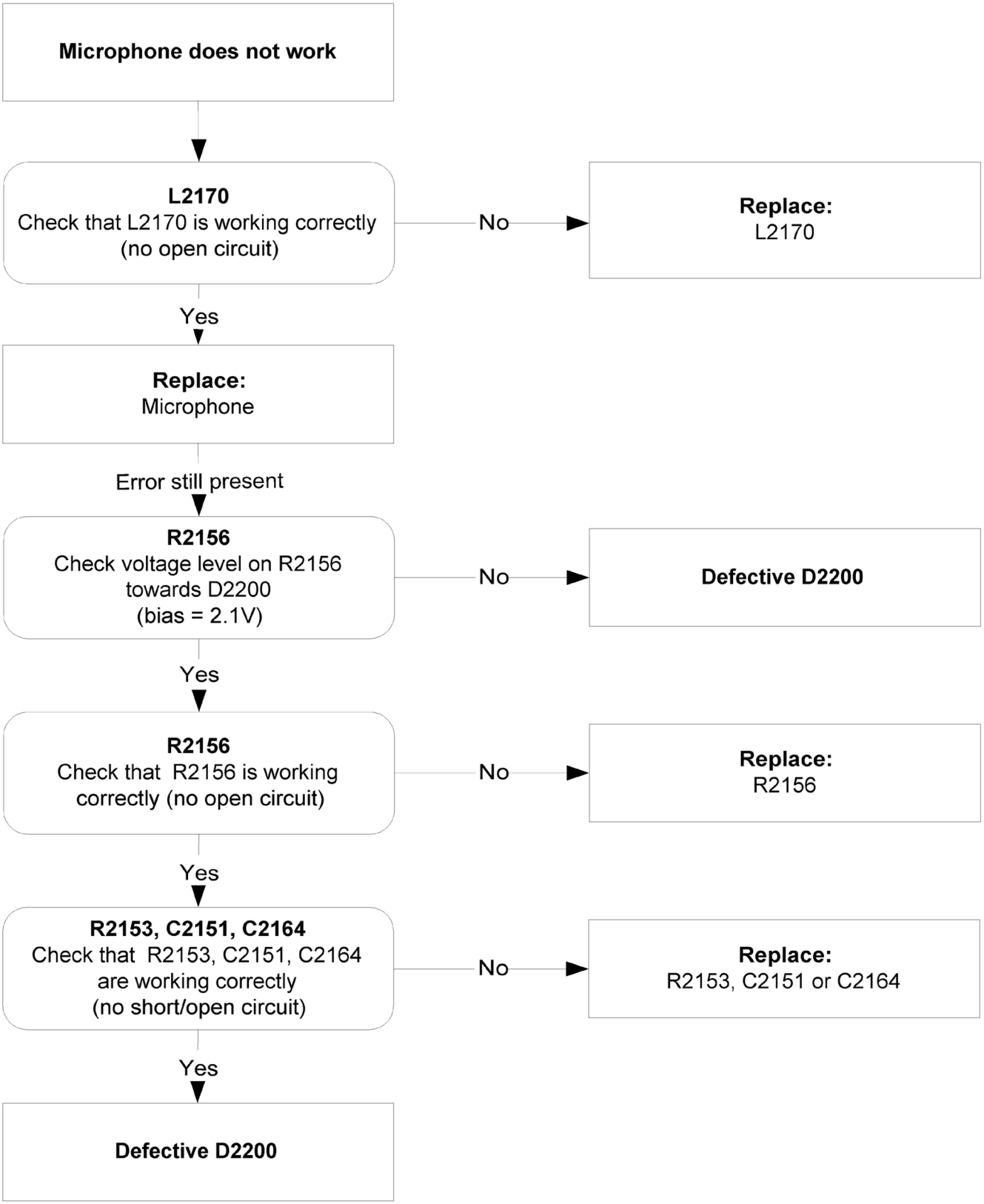

Figure 91 Microphone fault flow chart

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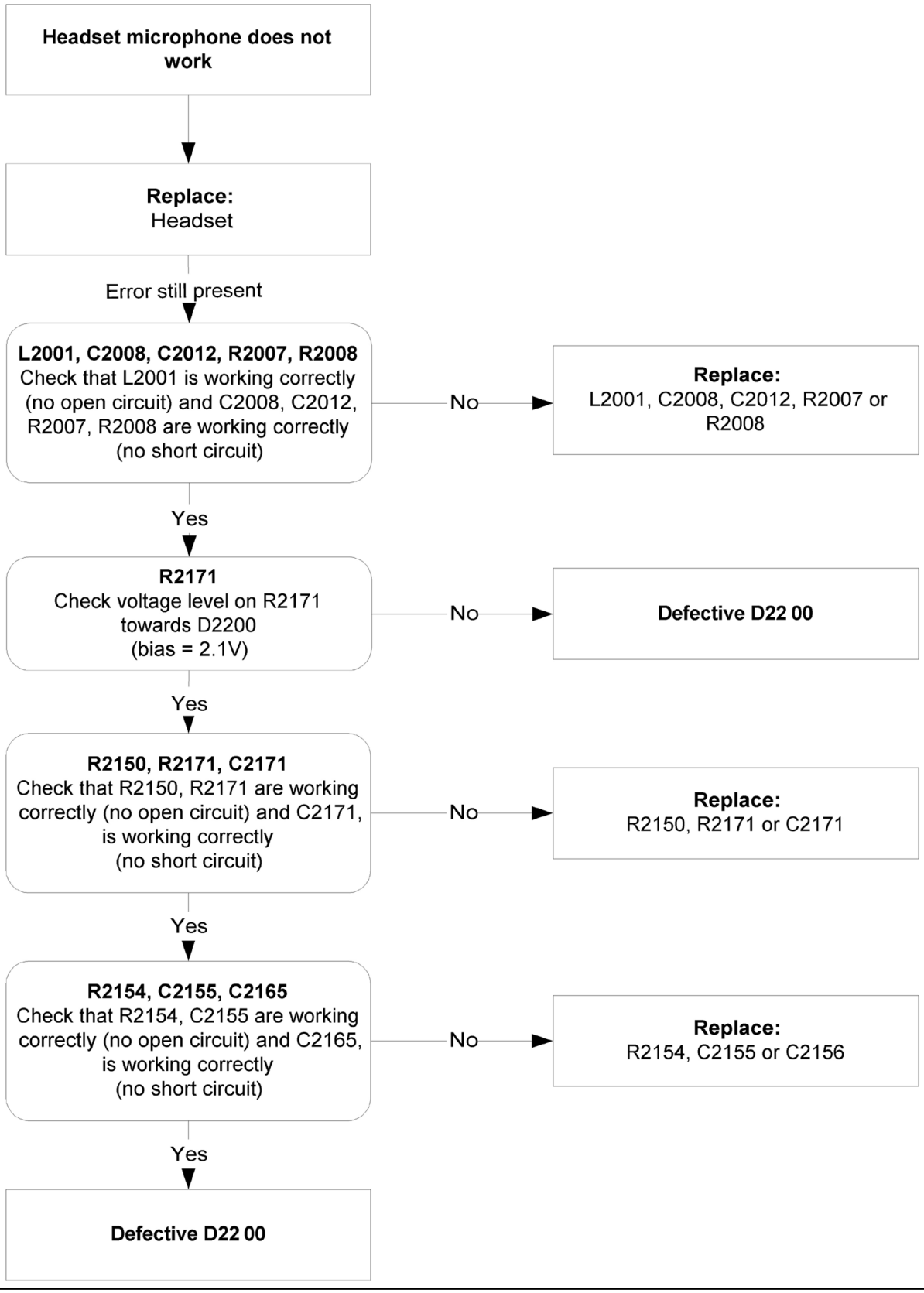
Headset microphone fault

Troubleshooting flow



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7 — RF troubleshooting

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General RF troubleshooting

General RF troubleshooting

Most RF semiconductors are static discharge sensitive

Two types of measurements are used in the following. It will be specified if the measurement type is "RF" or "LF".

- RF measurements are done with a Spectrum Analyzer and a high-frequency 500 ohm passive probe, for example HP54006A. (Note that when measuring with the 500 ohm probe the signal will be around 20 dB attenuated. The values in the following will have these 20 dB subtracted and represent the real value seen on the spectrum analyzer). Note that the testing have some losses which must be taken into consideration when calibrating the test system.
- LF (Low frequency) and DC measurements should be done with a 10:1 probe and an oscilloscope. The probe used in the following is 10 Mohm/8pF passive probe. If using another probe then bear in mind that the voltages displayed may be slightly different. Always make sure the measurement set-up is calibrated when measuring RF parameters on the antenna pad. Remember to include the loss in the module repair jig when realigning the phone.

So ESD protection must be applied during repair (ground straps and ESD soldering irons). RF IC N7600 and FEM are moisture sensitive so parts must be pre-baked prior to soldering. Apart from key-components described in this document there are a lot of discrete components (resistors, inductors and capacitors) for which troubleshooting is done by checking if soldering of the component is done properly and checking if the component is missing from PWB. Capacitors can be checked for short-circuiting and resistors for value by means of an ohmmeter, but be aware in-circuit measurements should be evaluated carefully. In the following both the name EGSM and GSM 900 will be used for the lower band and both PCN and GSM 1800 will be used for the upper band.

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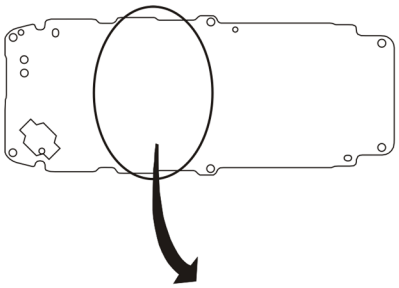
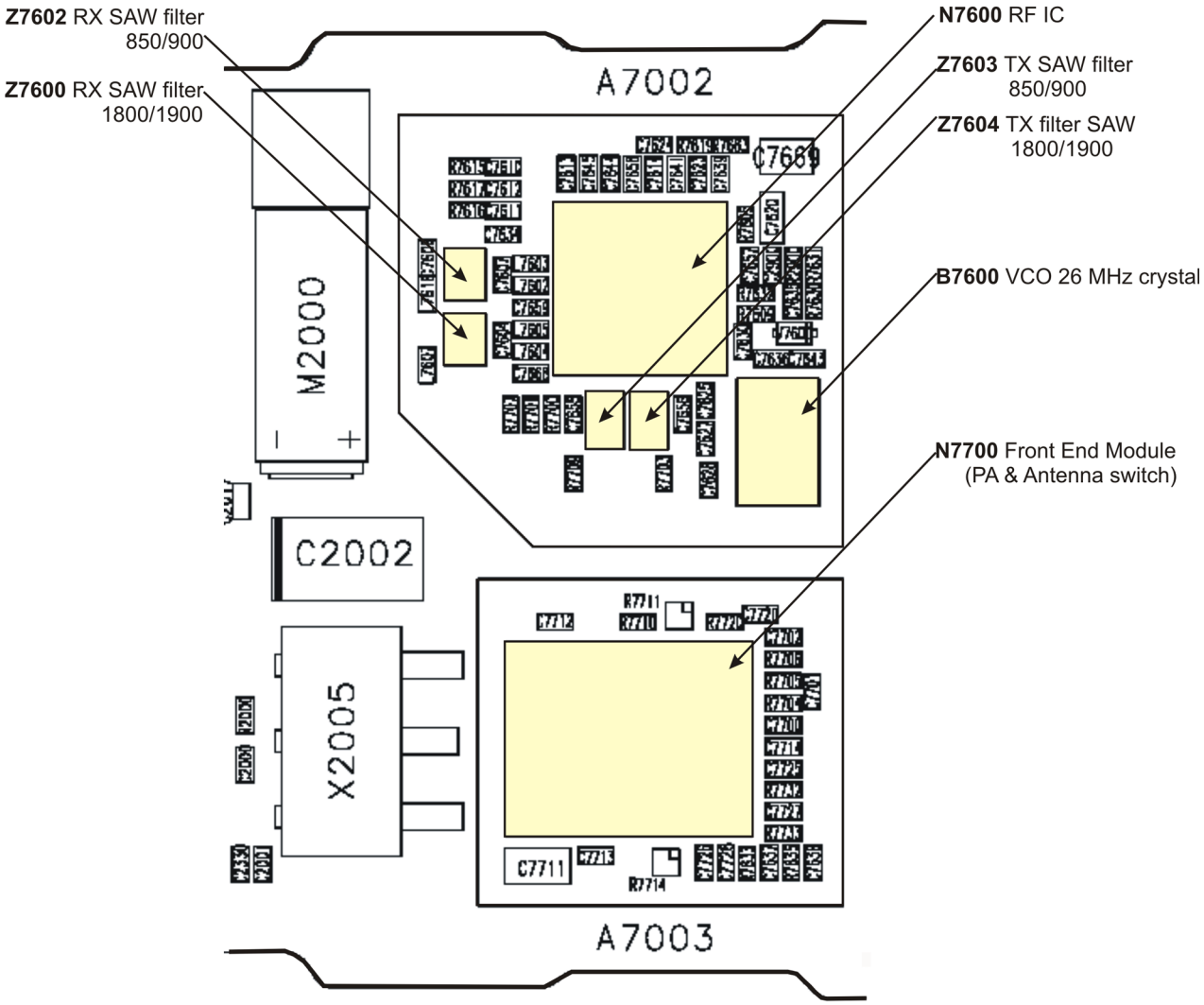
RF key components





Refer to the picture below for measuring points at the UEM (D2200).

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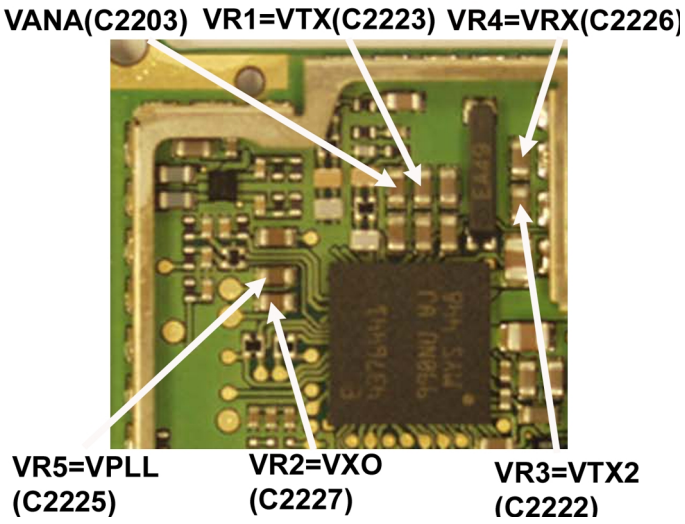

Figure 92 Supply points at UEM (D2200)

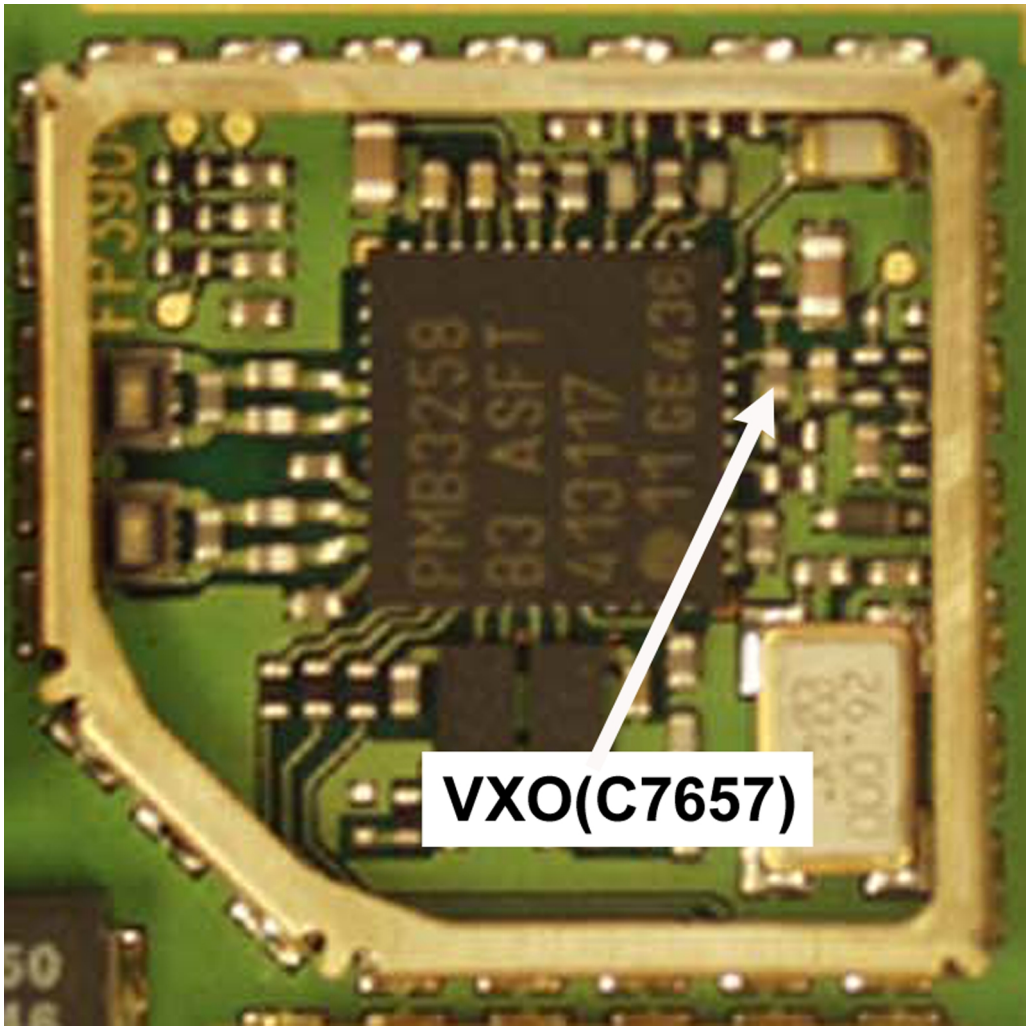

Figure 93 Supply point at RF IC (N7600)

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Auto tuning

Context

This phone can be tuned automatically. Autotune is designed to align the phone's RF part easier and faster. It performs calibrations, tunings and measurements of RX and TX. The results are displayed and logged in a result file, if initiated.

Hardware requirements for auto tuning:

- PC (Windows 2000/NT) with GPIB card
- Power supply
- Product specific module jig
- Cables: 3 (alt.1) RF cable, 1 GPIB cable and DAU-9S
- Signal analyser (TX), signal generator (RX) and RF-splitter *or* one device including all.

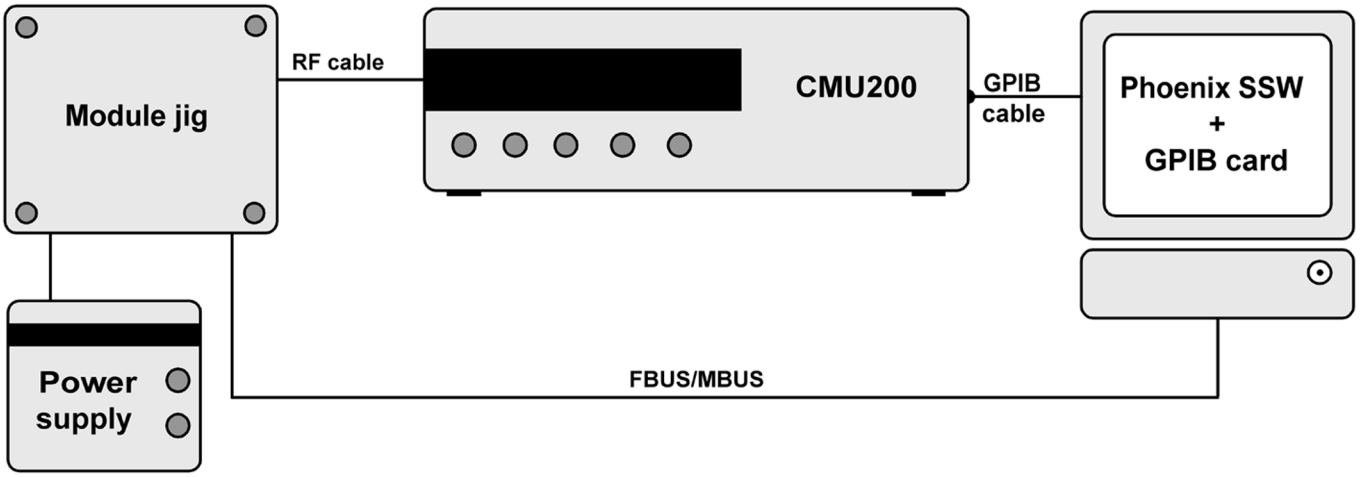

Figure 94 Auto tuning concept with CMU200

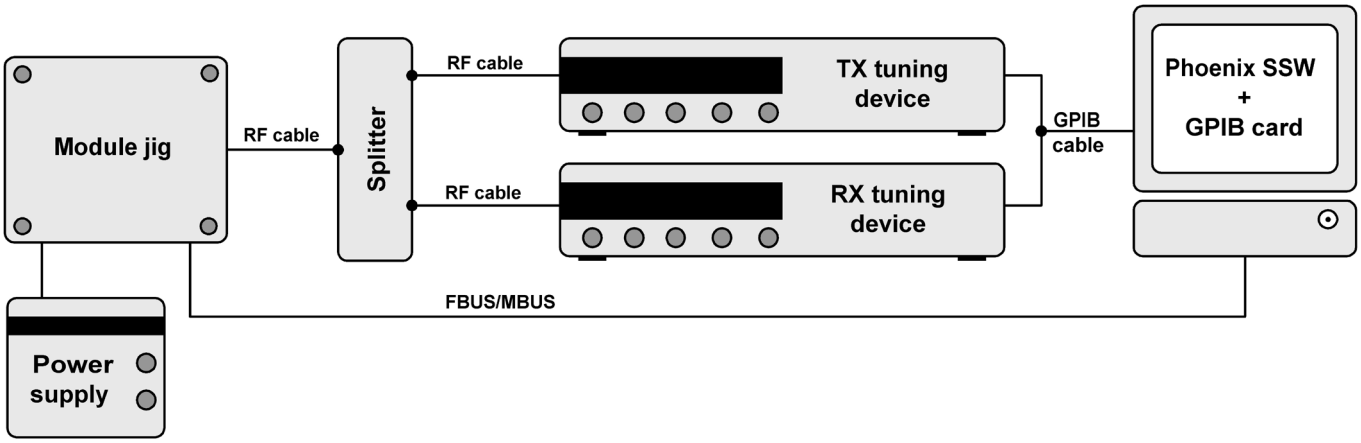

Figure 95 Auto tuning concept with RX and TX tuning devices and splitter

Copy the two phone specific ini-files, for example *rm_13_tunings.ini* and *autotune_RM-13.ini,* to a phone specific folder, for example *|Phoenix|products|RM-13|*.

Steps

1. Make sure the phone (in the jig) is connected to the equipment. Else, some menus will not be shown in Phoenix.

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2. The first time you are using automatic tuning on this phone model, on this computer, you will have to *Set loss* for cables and jigs.
3. To go to autotune, select *Tuning (Alt-U)* > *Auto-Tune (Alt-A)* from the menu.
4. If you need more assistance, please refer to the Phoenix *Help*.

Receiver

General instructions for GSM 850 RX troubleshooting

Steps

1. Connect the phone to a PC with the module repair jig.
2. Start *Phoenix* and establish a connection to the phone with the data cable e.g. FBUS.
3. Select File and Scan product.
4. Wait a while for the PC to read the information from the phone.
5. Select Testing and RF Controls.
6. Set the parameters as follows:
   i Active Unit: RX
   ii Band: GSM 850
   iii Operation Mode: Continuous mode
   iv RX/TX Channel 190
   v AGC: 8: FEG_ON + DTOS_ON+BB_6=Vgain_36

Results

The setup should now look like this:

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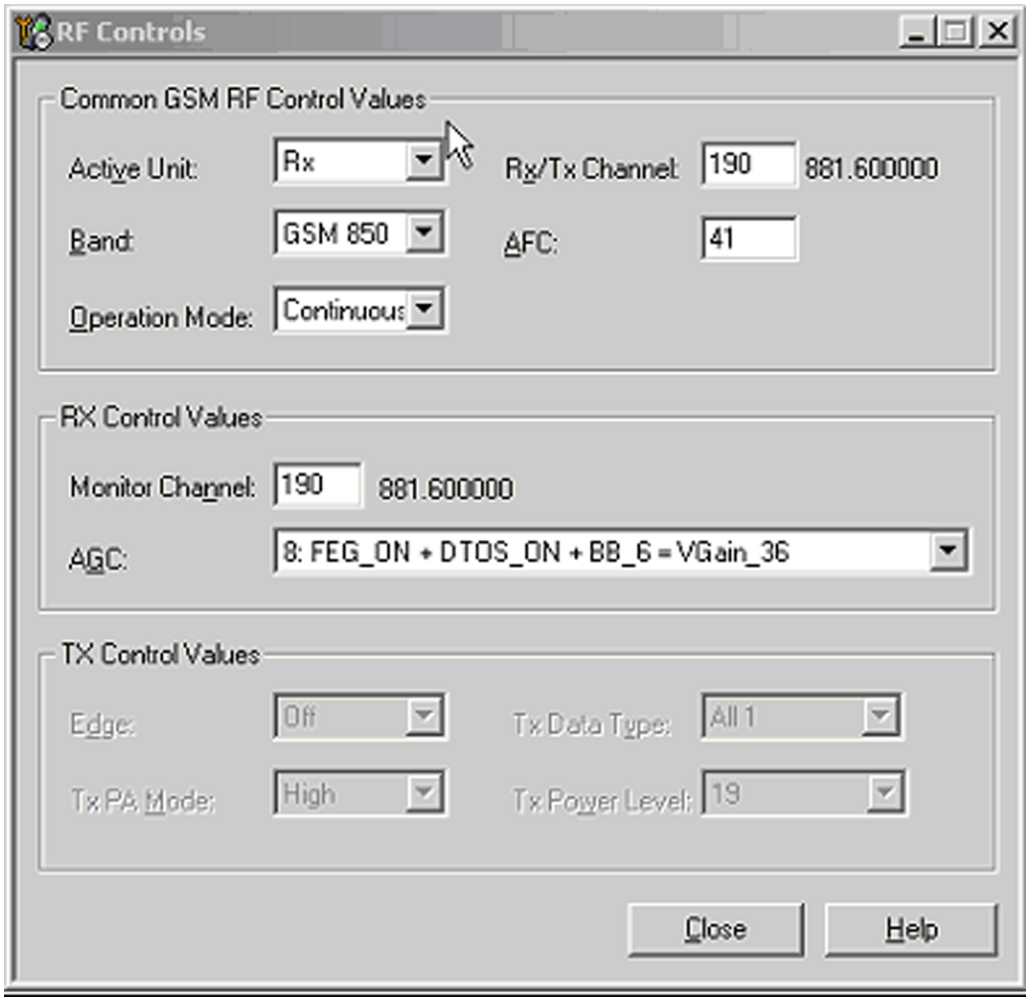

Figure 96 GSM850 RF controls window

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Troubleshooting diagram for GSM 850 receiver

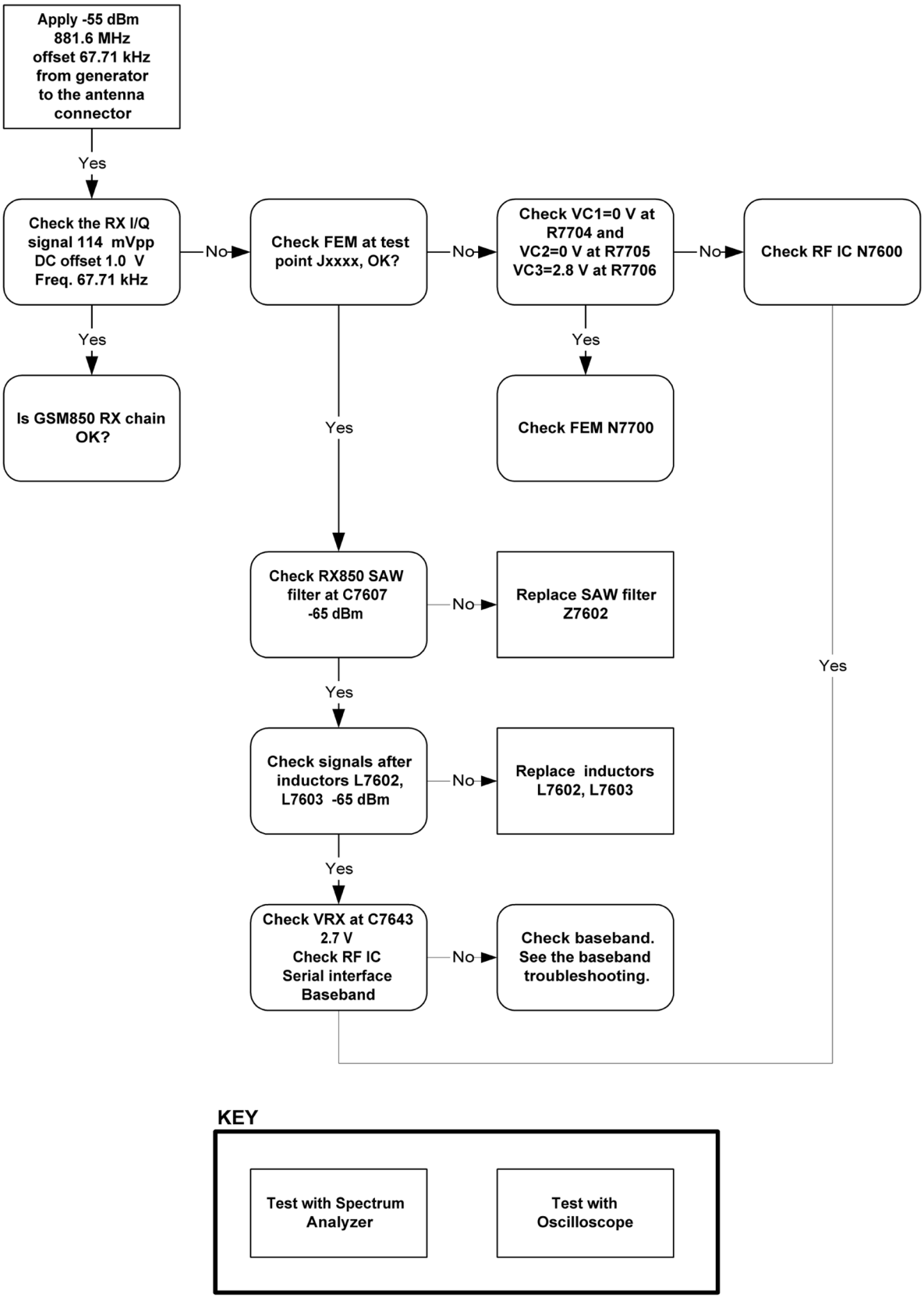

Figure 97 GSM 850 Receiver troubleshooting

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By measuring with an oscilloscope at RXIP or RXQP on a working GSM 850 receiver this picture should be seen. Signal amplitude 114 mVp-p. DC offset 1.0 V.

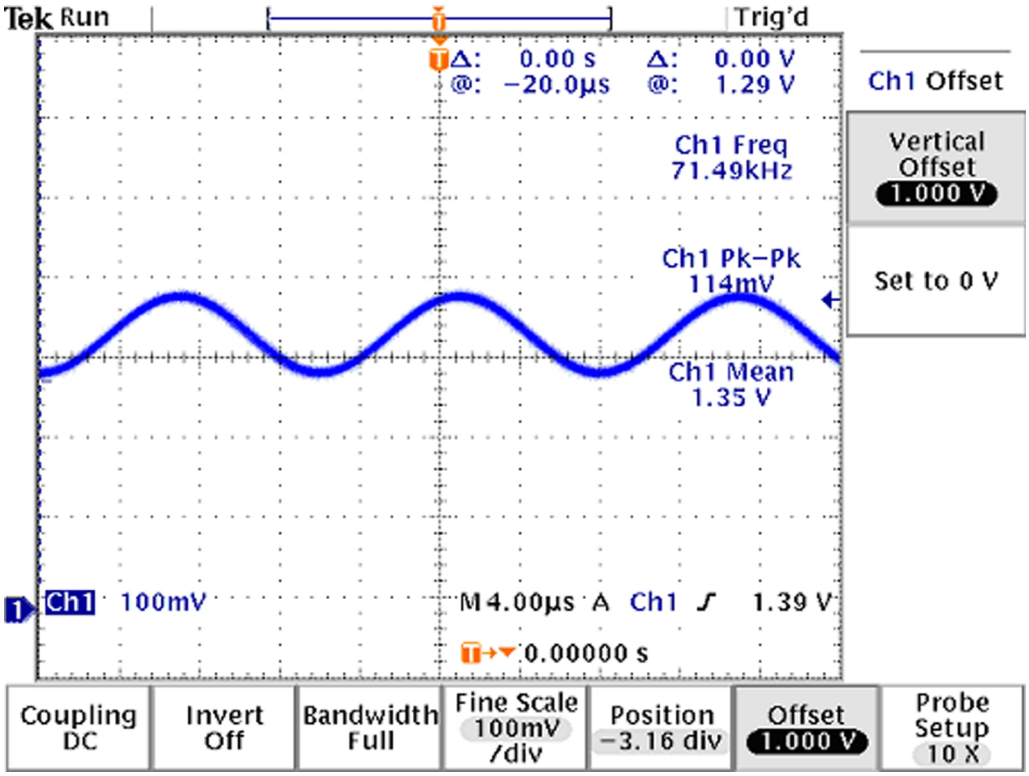

Figure 98 850 RX I/Q signal waveform

General instructions for GSM1900 RX troubleshooting

Steps

1. Connect the phone to a PC with the module repair jig.
2. Start Phoenix and establish a connection to the phone with the data cable e.g. FBUS.
3. Select File and Scan product.
4. Wait a while for the PC to read the information from the phone.
5. Select Testing and RF Controls.
6. Set the parameters as follows:
   - i Active Unit: RX
   - ii Band: GSM 1900
   - iii Operation Mode: Continuous mode
   - iv RX/TX Channel 661
   - v AGC: 8: FEG_ON + DTOS_ON+BB_6=Vgain_36

Results

The setup should now look like this:

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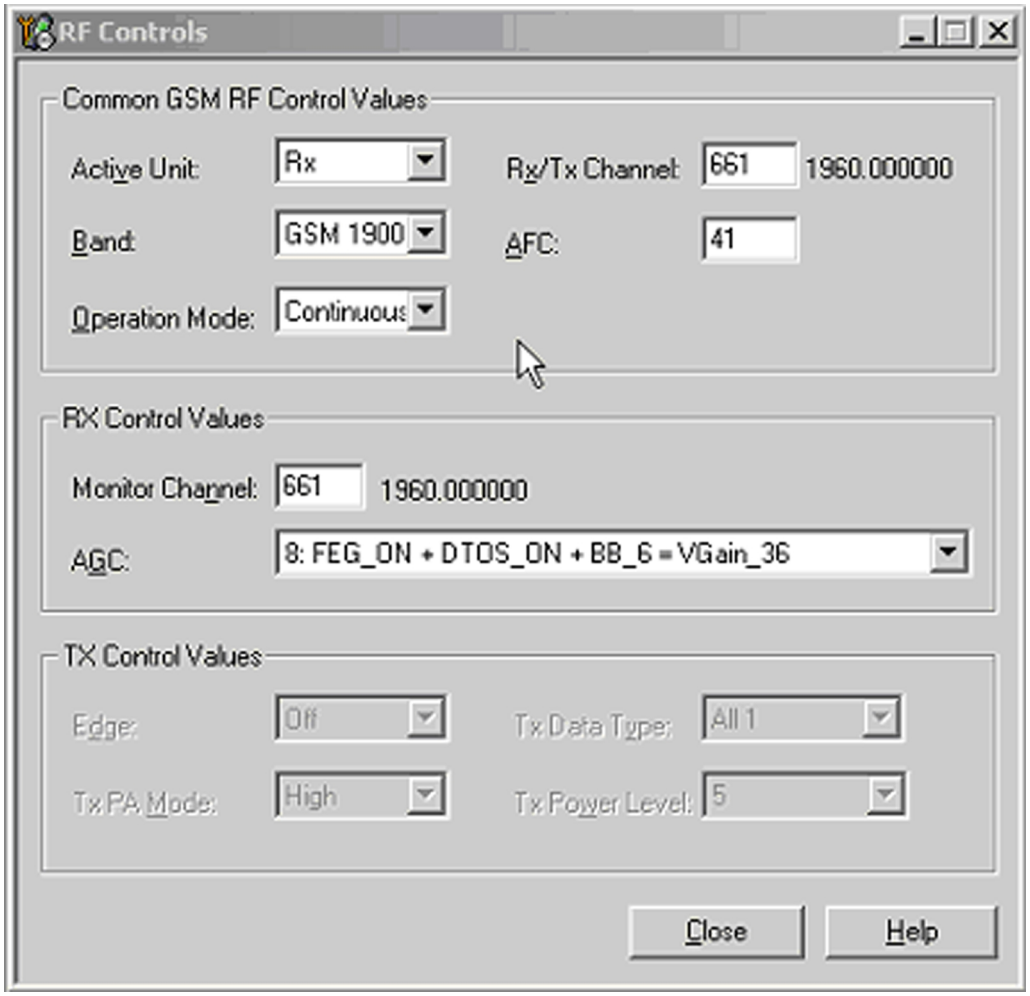

Figure 99 GSM 1900 RF controls window

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Troubleshooting diagram for GSM 1900 receiver

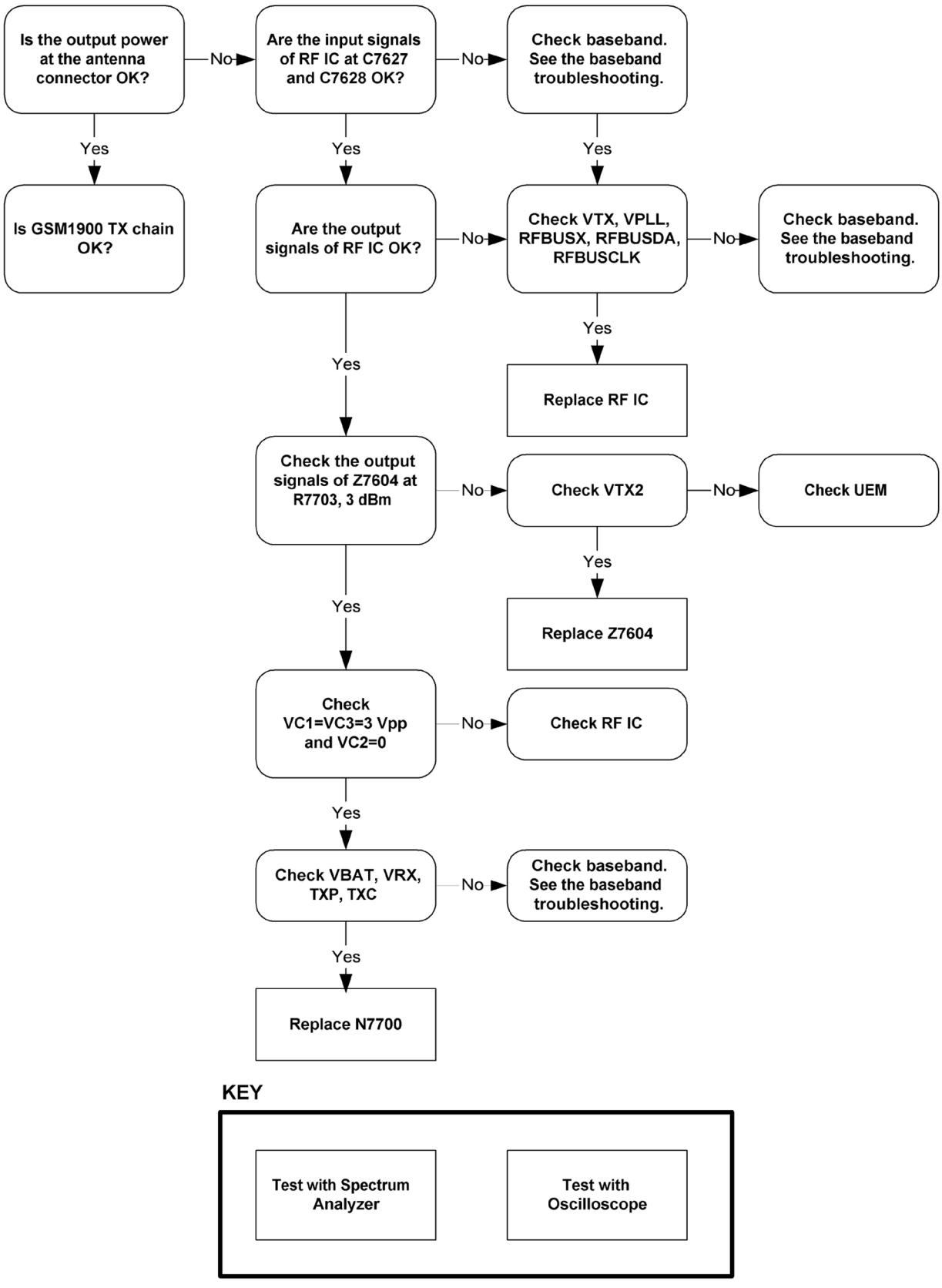

Figure 100 GSM 1900 Receiver troubleshooting

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By measuring with an oscilloscope at RXIP or RXQP on a working GSM 1900 receiver this picture should be seen. Signal amplitude 108 mVp-p. DC offset 1.0 V.

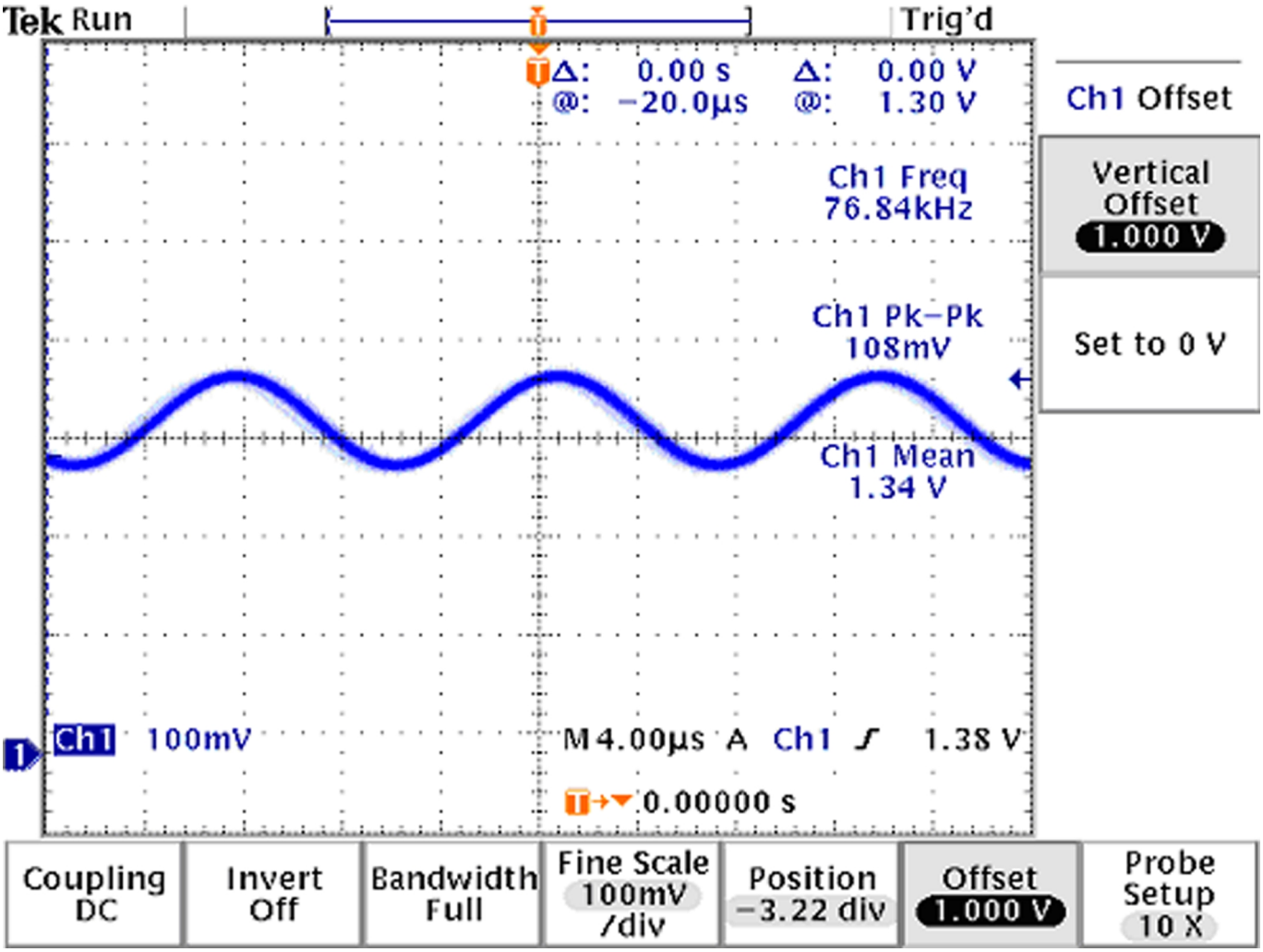

Figure 101 1900 RX I/Q signal waveform

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Measurement points in the receiver

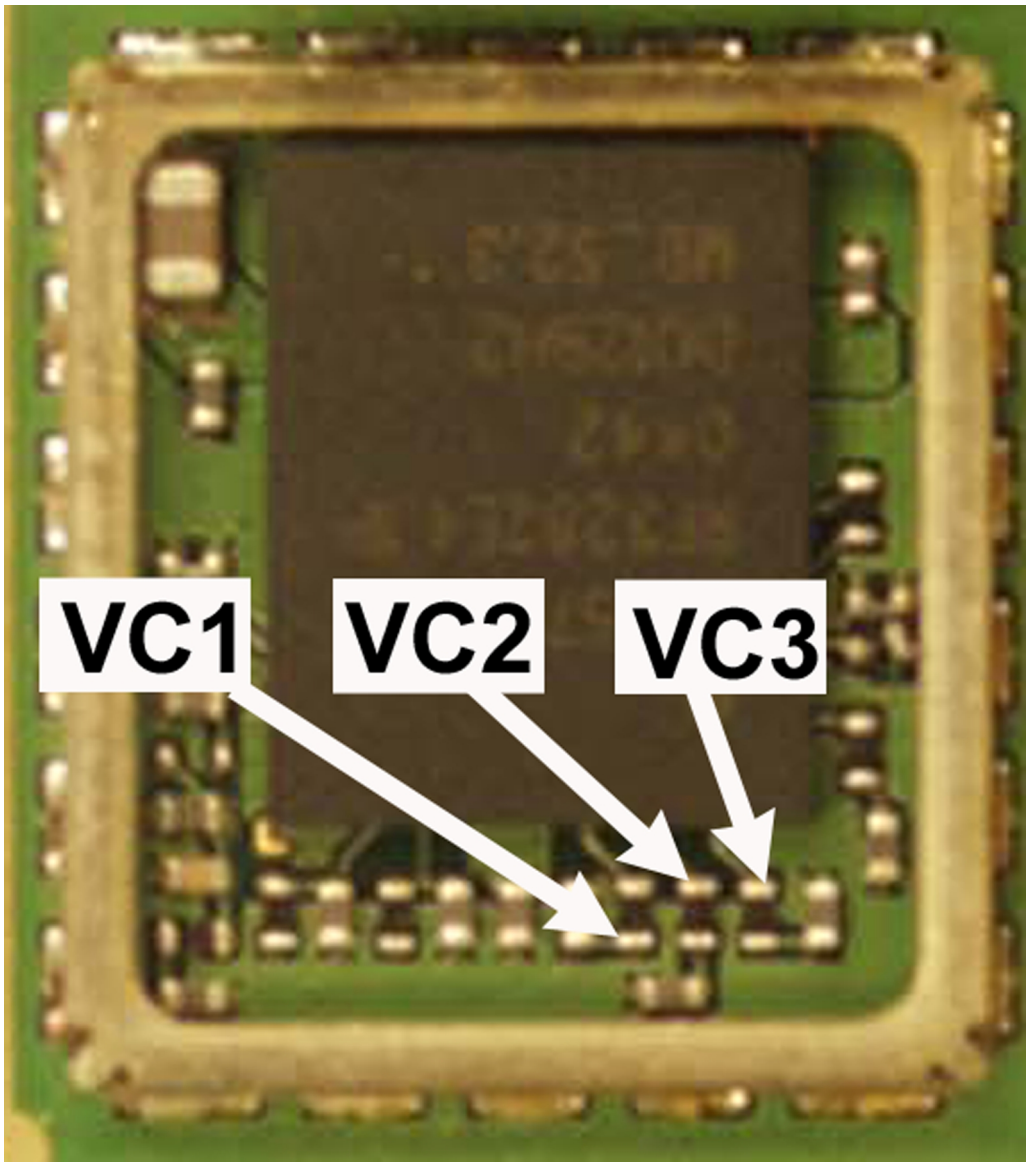

Figure 102 RX measurements point of the control voltages to FEM N7700

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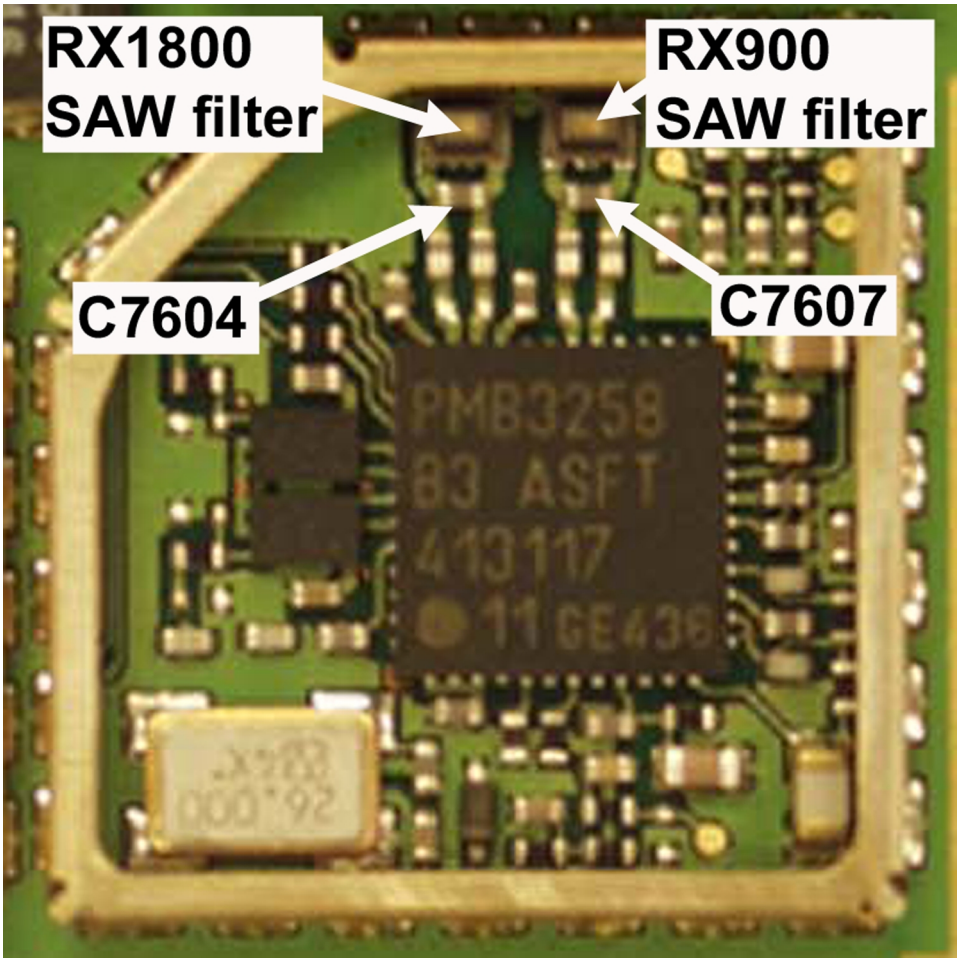

Figure 103 Measurement points at the RX SAW Filters – Z7600/Z7602

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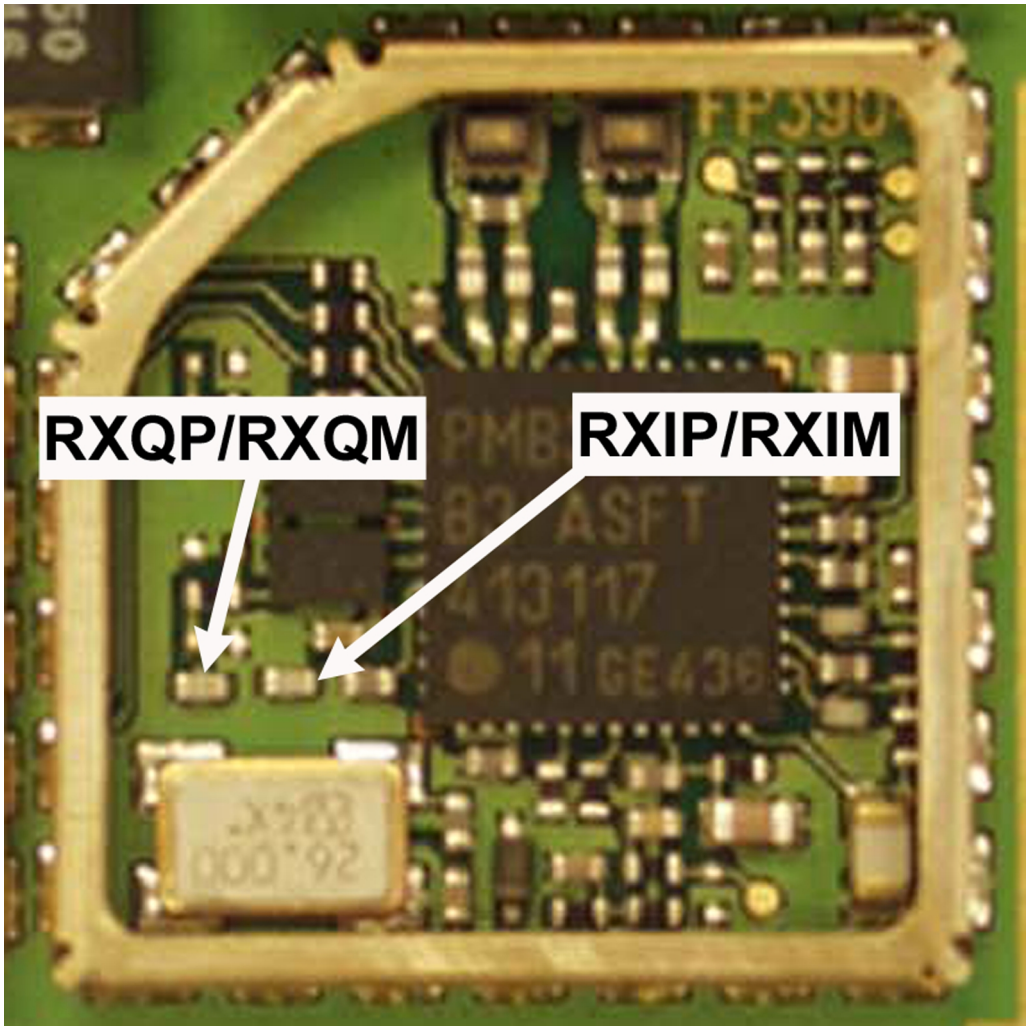

Figure 104 RX I/Q signals

General instructions for GSM900 RX troubleshooting

Steps

1. Connect the phone to a PC with the module repair jig.
2. Start *Phoenix* and establish a connection to the phone with the data cable e.g. FBUS.
3. Select File and Scan product.
4. Wait a while for the PC to read the information from the phone.
5. Select Testing and RF Controls.
6. Set the parameters as follows:
   - i Active Unit: RX
   - ii Band: GSM 900
   - iii Operation Mode: Continuous mode
   - iv RX/TX Channel 37
   - v AGC: 8: FEG_ON + DTOS_ON+BB_6=Vgain_36

Results

The setup should now look like this:

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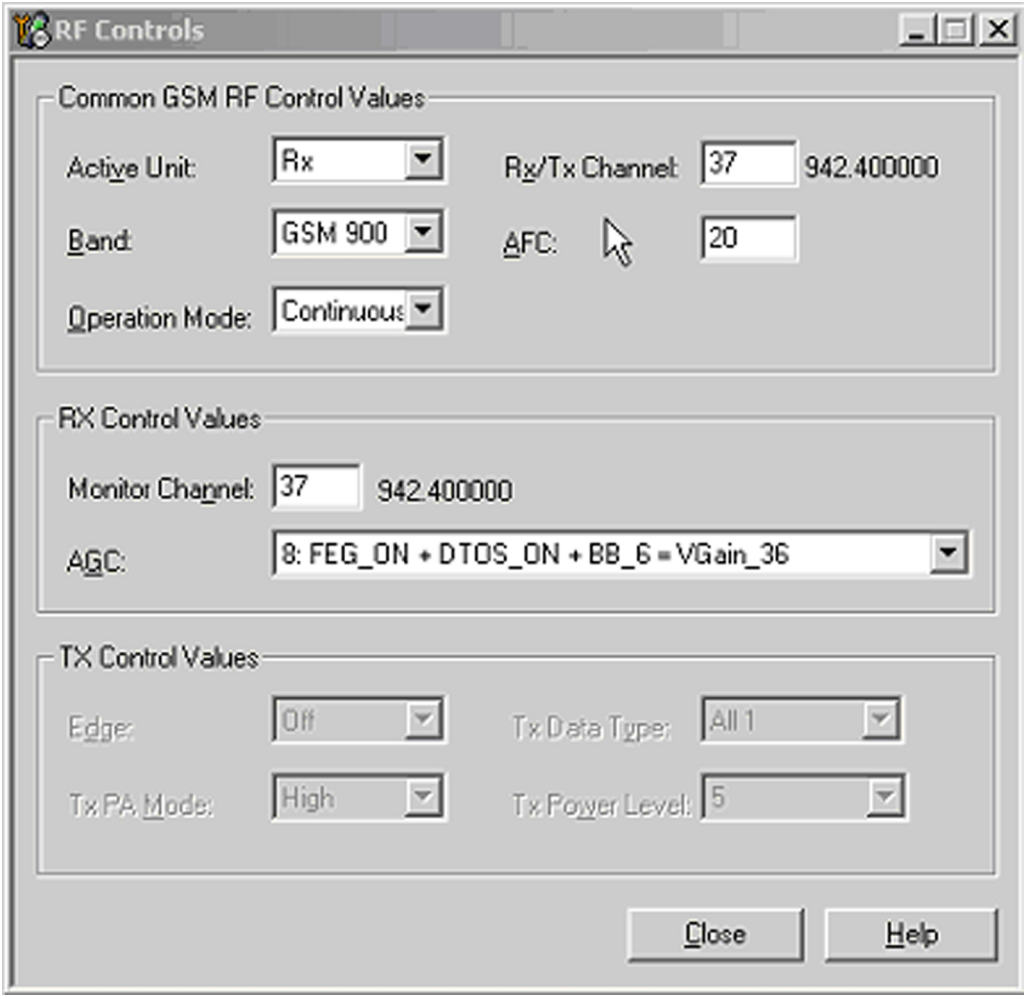

Figure 105 GSM900 RF controls window

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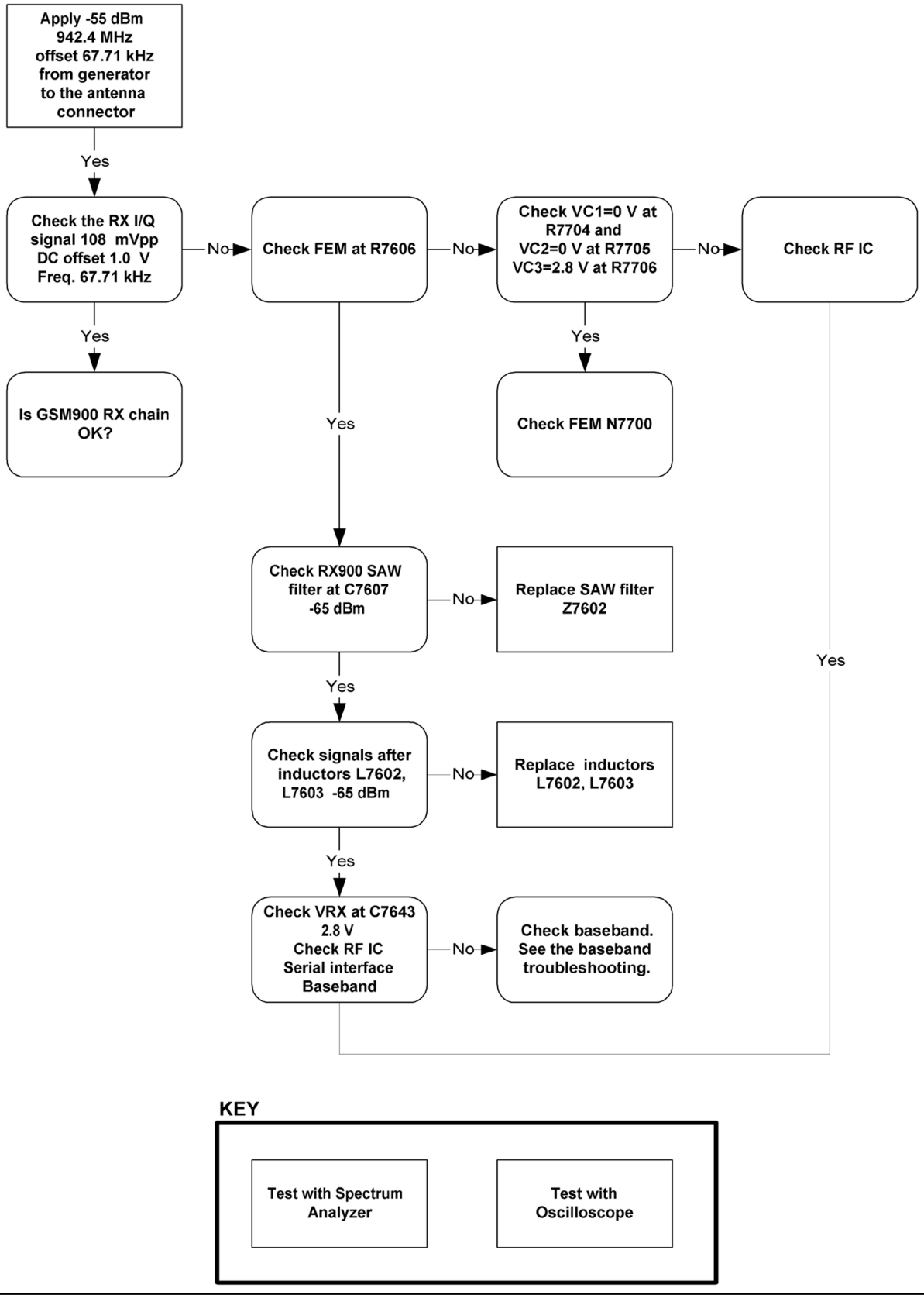
Troubleshooting diagram for GSM 900 receiver

Troubleshooting flow



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By measuring with an oscilloscope at RXIP or RXQP on a working GSM900 receiver this picture should be seen. Signal amplitude 114mVp-p. DC offset 1.0V.

Results

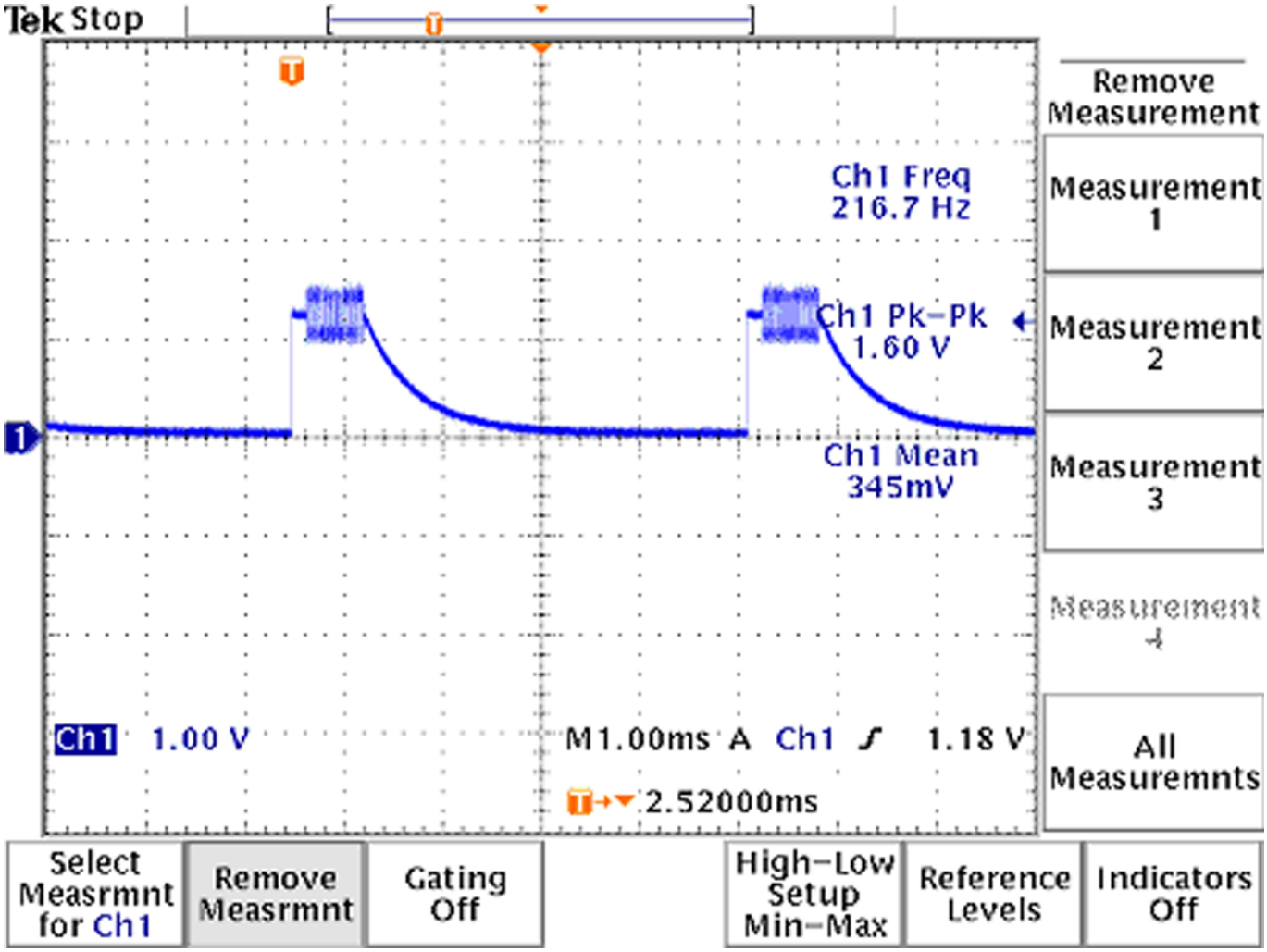

Figure 106 900 RX I/Q signal waveform

General instructions for GSM 1800 RX troubleshooting

Steps

1. Connect the phone to a PC with the module repair jig.
2. Start *Phoenix* and establish a connection to the phone with the data cable e.g. FBUS.
3. Select File and Scan product.
4. Wait a while for the PC to read the information from the phone.
5. Select Testing and RF Controls.
6. Set the parameters as follows:
   i Active Unit: RX
   ii Band: GSM 1800
   iii Operation Mode: Continuous mode
   iv RX/TX Channel 700

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v AGC: 8: FEG_ON + DTOS_ON+BB_6=Vgain_36

Results

The setup should now look like this:

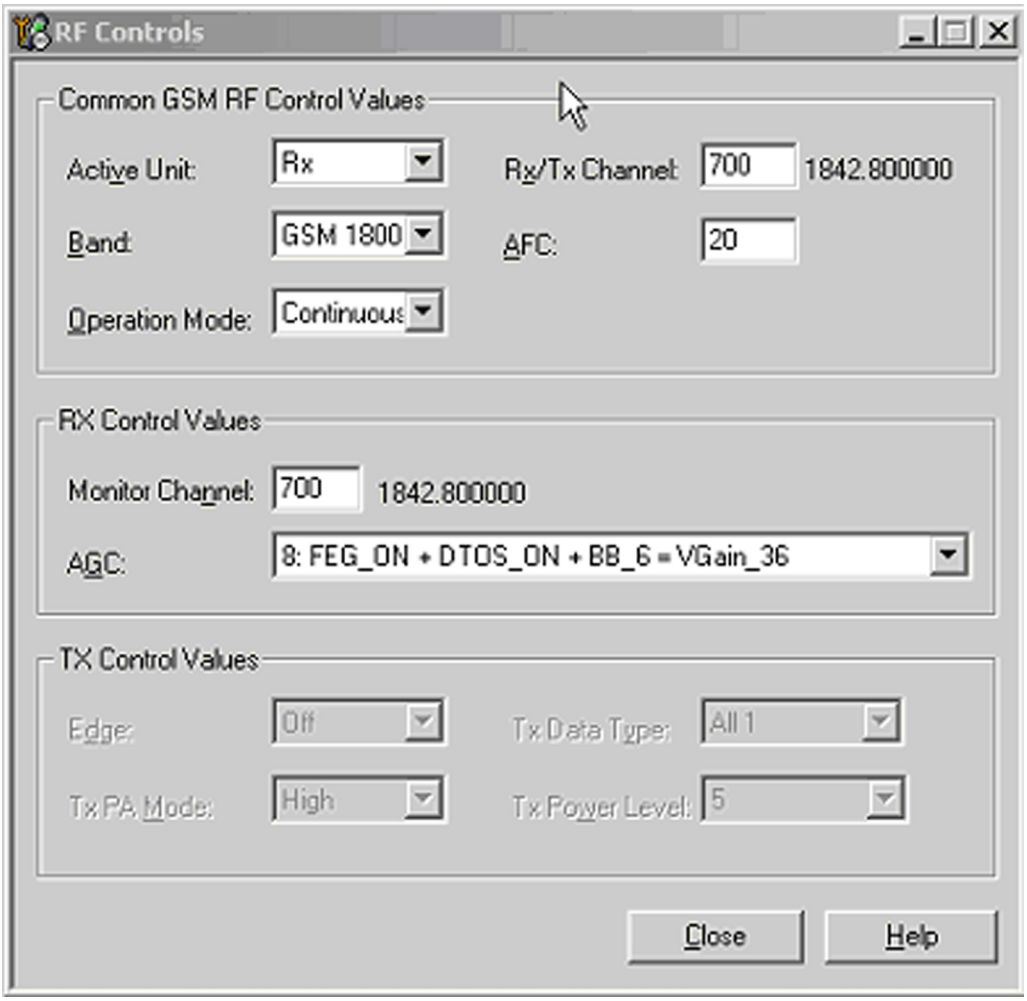

Figure 107 GSM1800 RF controls window

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Troubleshooting diagram for GSM 1800 receiver

Troubleshooting flow

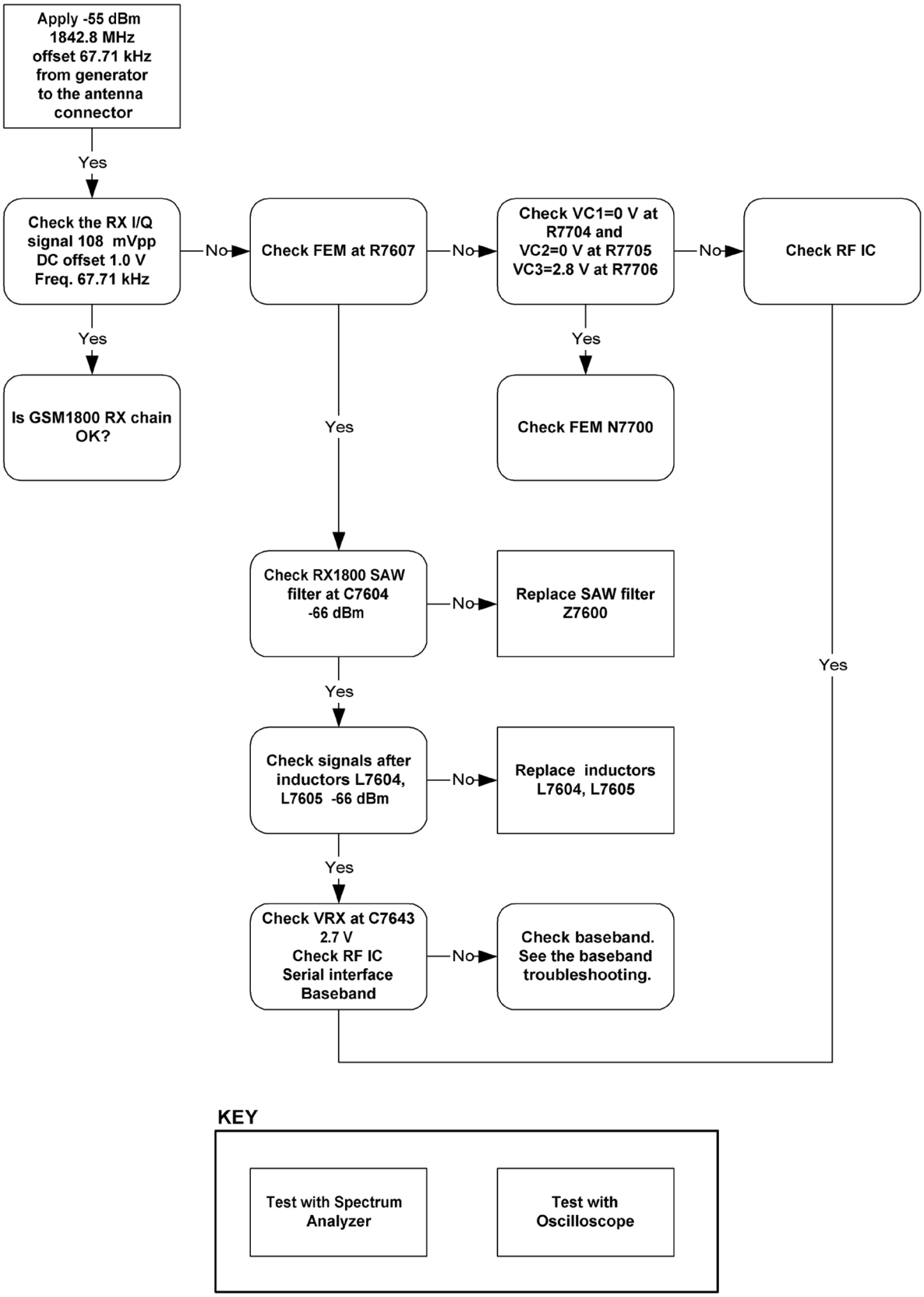

Figure 108 GSM 1800 receiver troubleshooting

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By measuring with an oscilloscope at RXIP or RXQP on a working GSM1800 receiver this picture should be seen. Signal amplitude 114mVp-p. DC offset 1.0V.

Results

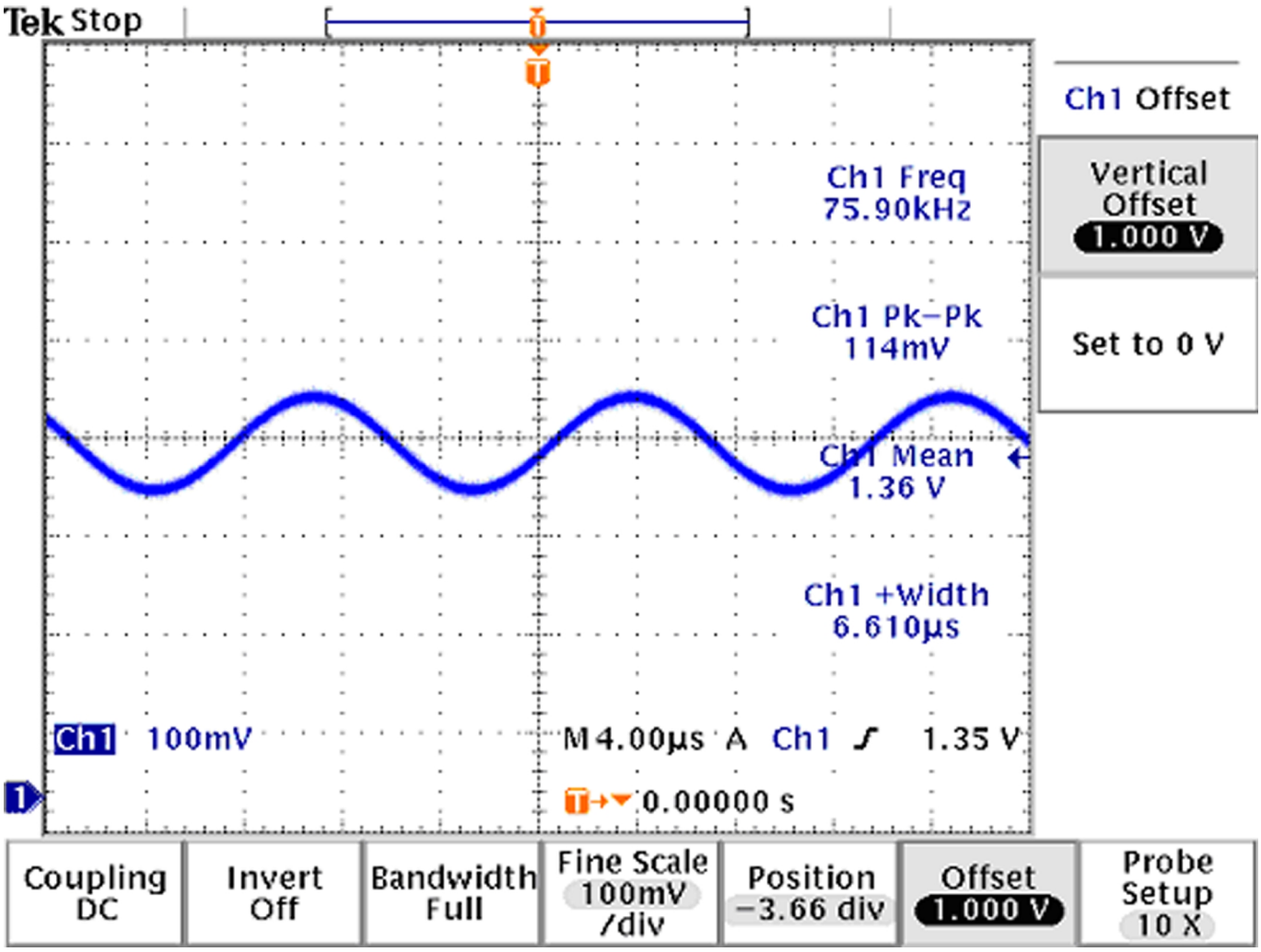

Figure 109 1800 RX I/Q signal waveform

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Measurement points in the receiver

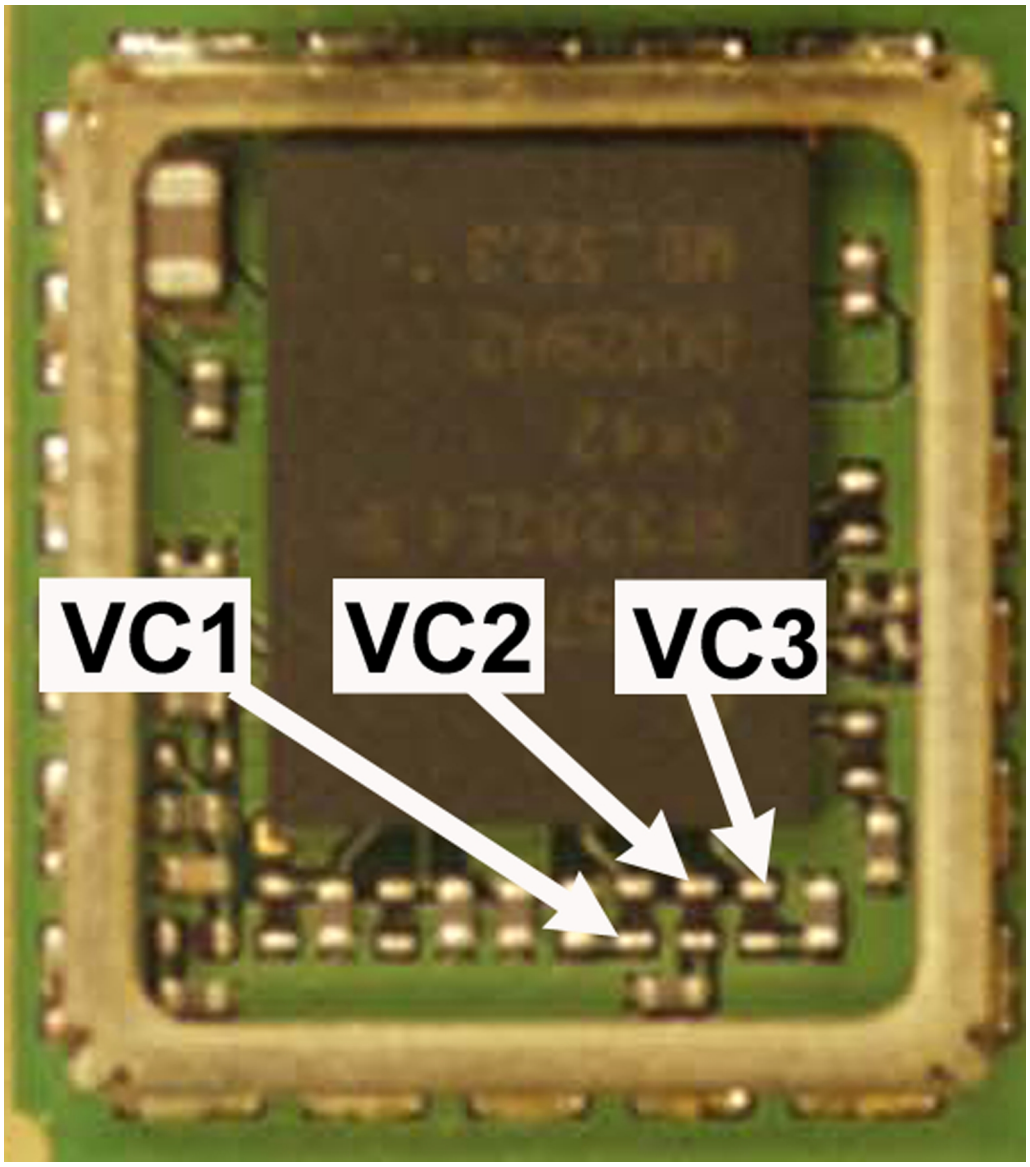

Figure 110 RX measurements point of the control voltages to FEM N7700

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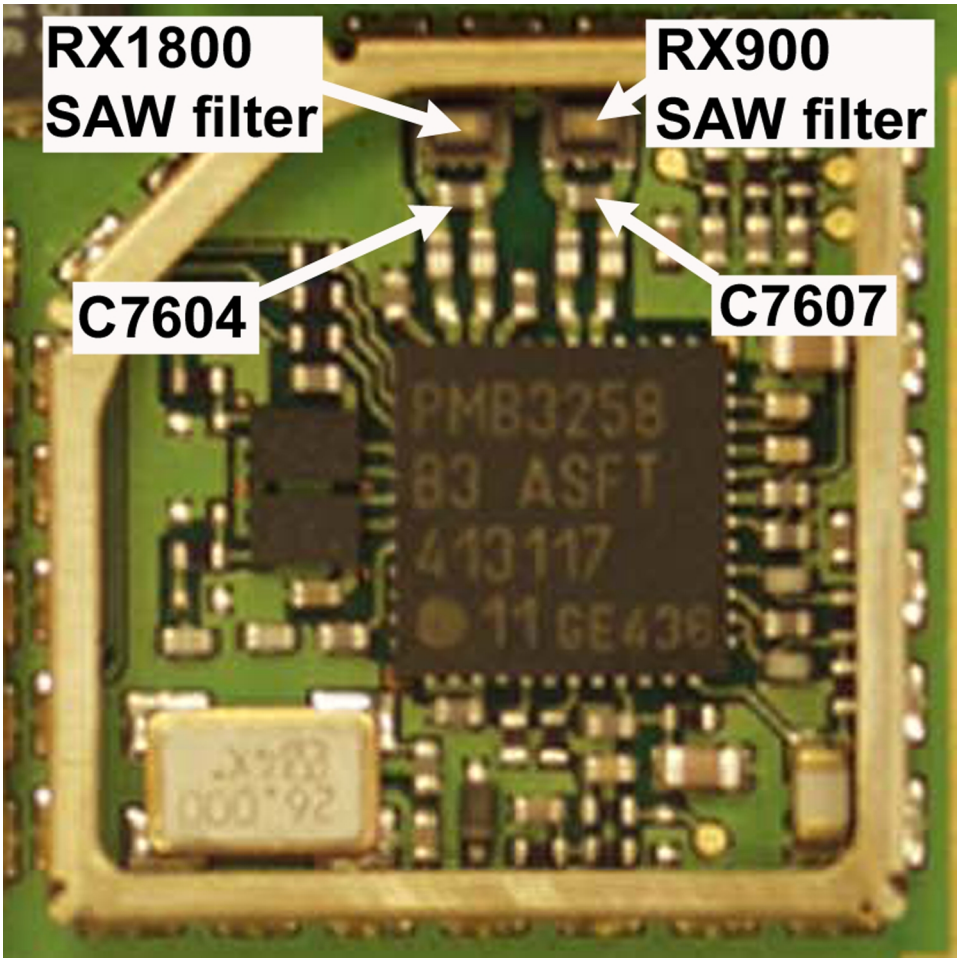

Figure 111 Measurement points at the RX SAW Filters – Z7600/Z7602

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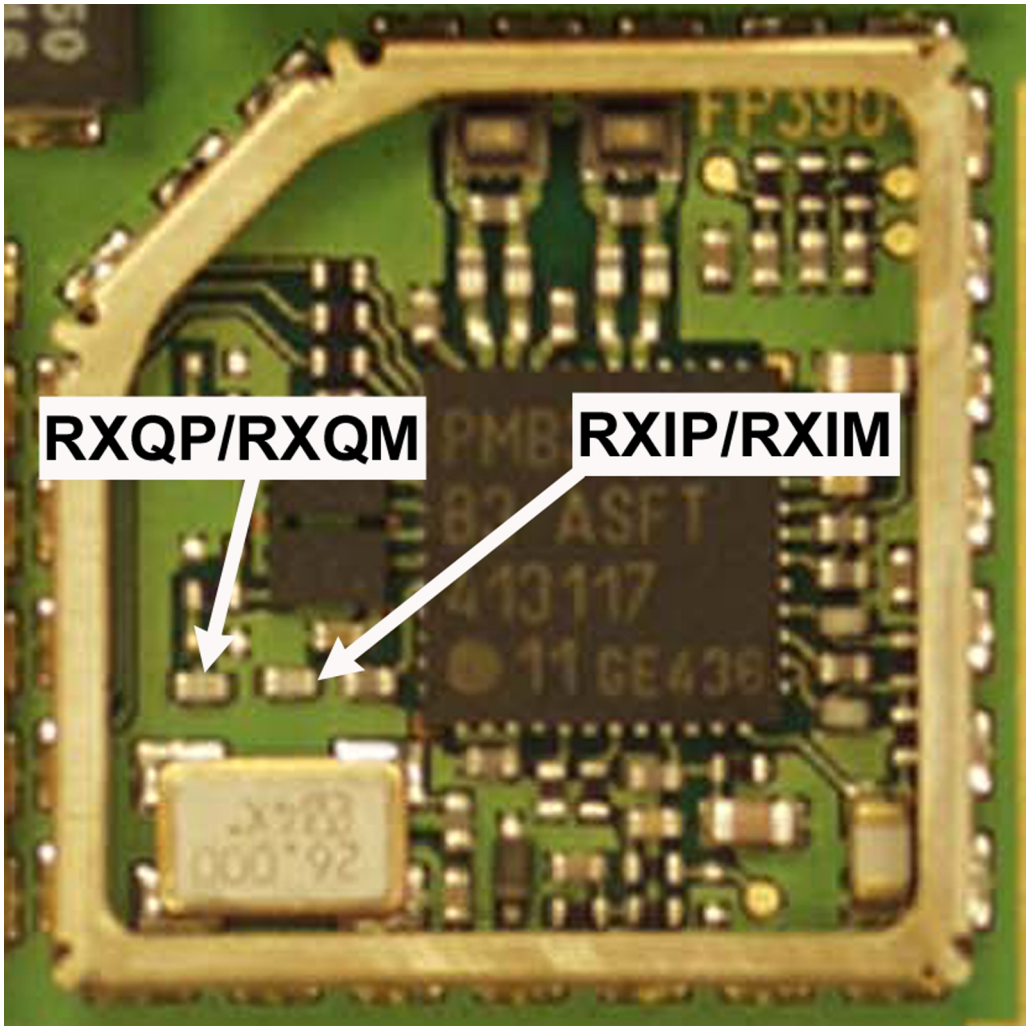

Figure 112 RX I/Q signals

Transmitter

General instructions for GSM 850 TX troubleshooting

Steps

1. Apply a RF-cable to the RF-connector to allow the transmitted signal act as normal. RF-cable should be connected to an attenuator at least 10dB before connected to the measurement equipment, otherwise the PA may be damaged.
2. Start *Phoenix* and establish a connection to the phone with the data cable e.g. FBUS.
3. Select File and Scan product.
4. Wait a while for the PC to read the information from the phone.
5. Select Testing and RF Controls.
6. Set the parameters as follows:
   i Band: GSM 850
   ii Active Unit: RX
   iii TX Power Level: 5
   iv TX Data Type: Random

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Results

The setup should now look like this:

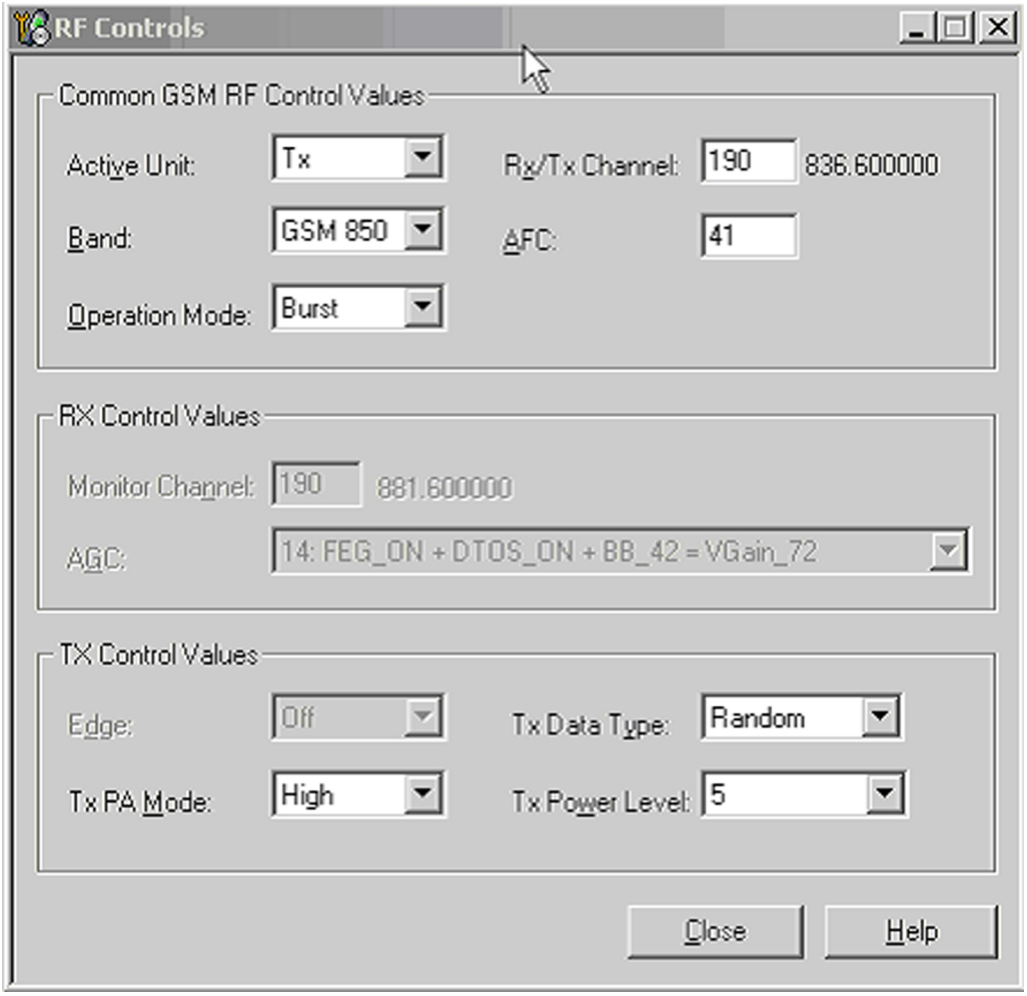

Figure 113 GSM 850 RF controls window

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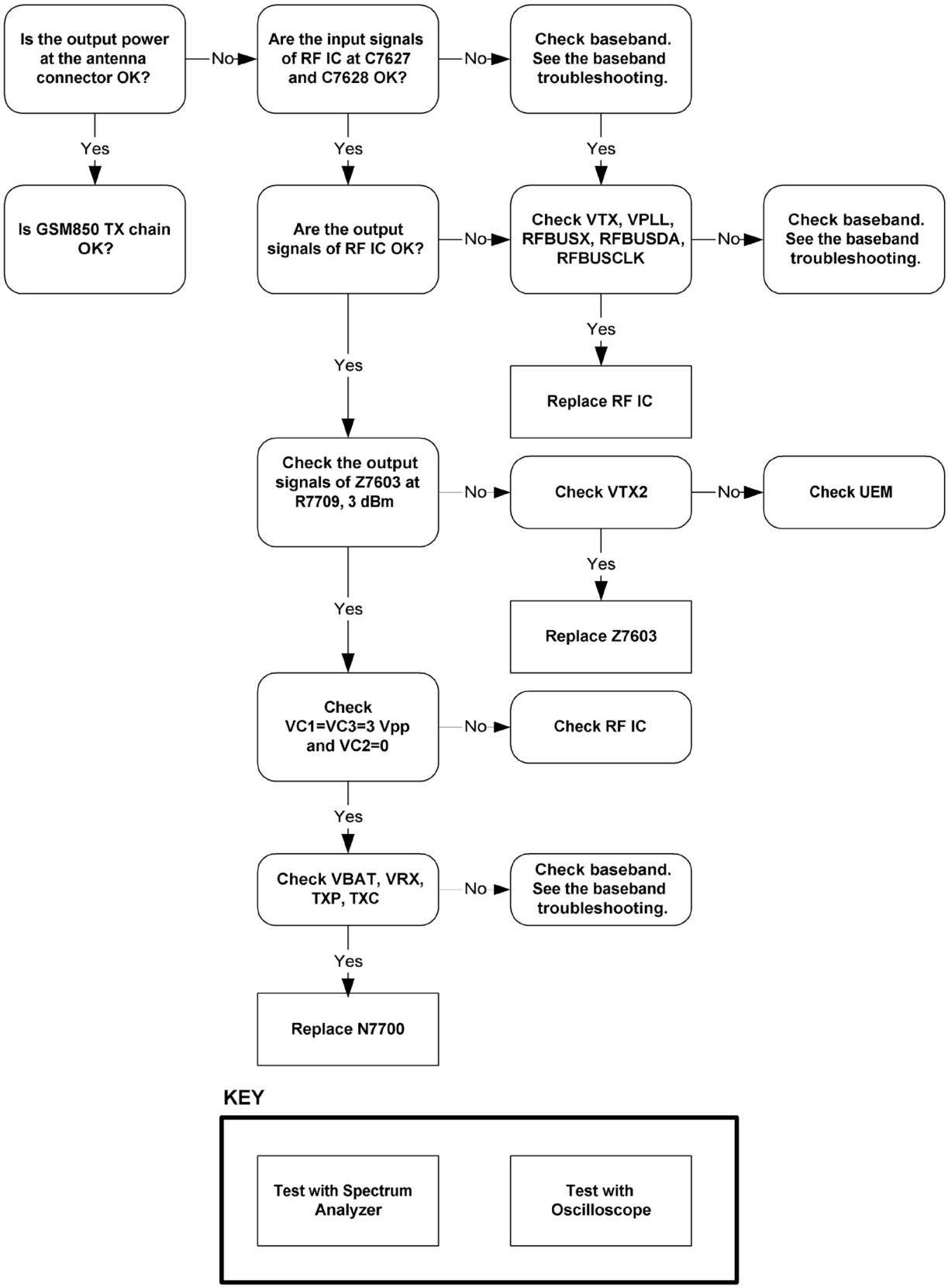
Troubleshooting diagram for GSM 850 transmitter

GSM 850 TX output power



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Measure the output power of the phone; it should be about 32.5dBm. Remember the cable loss is about 0.3dB.

Results

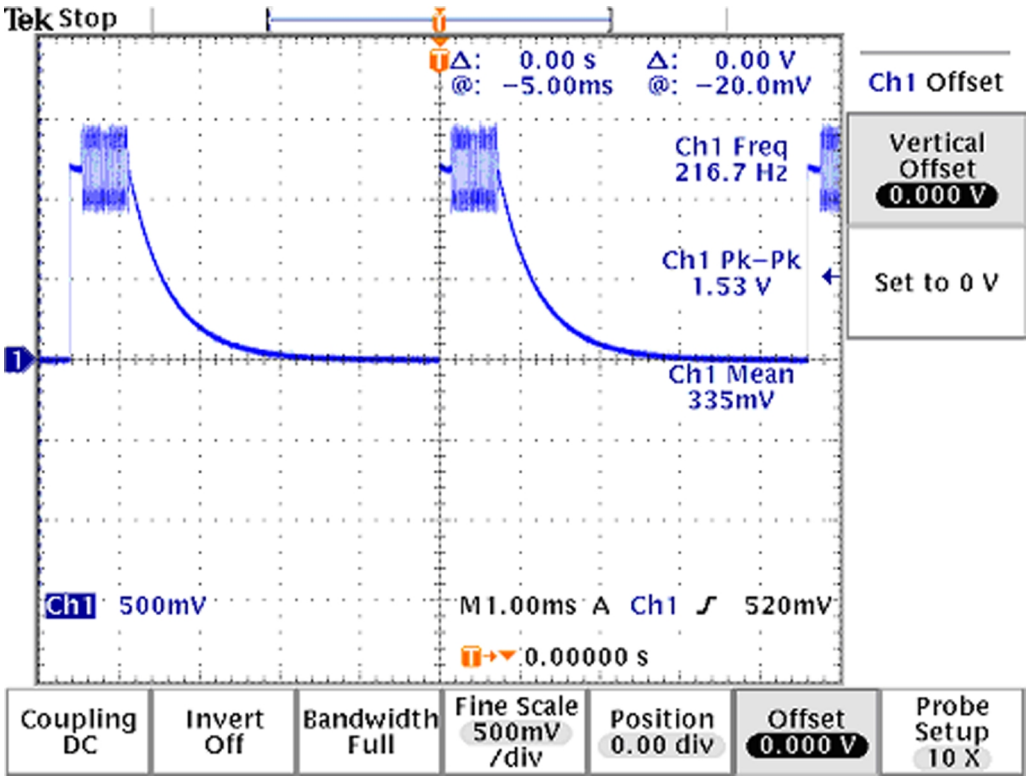

Figure 114 TX I/O signal

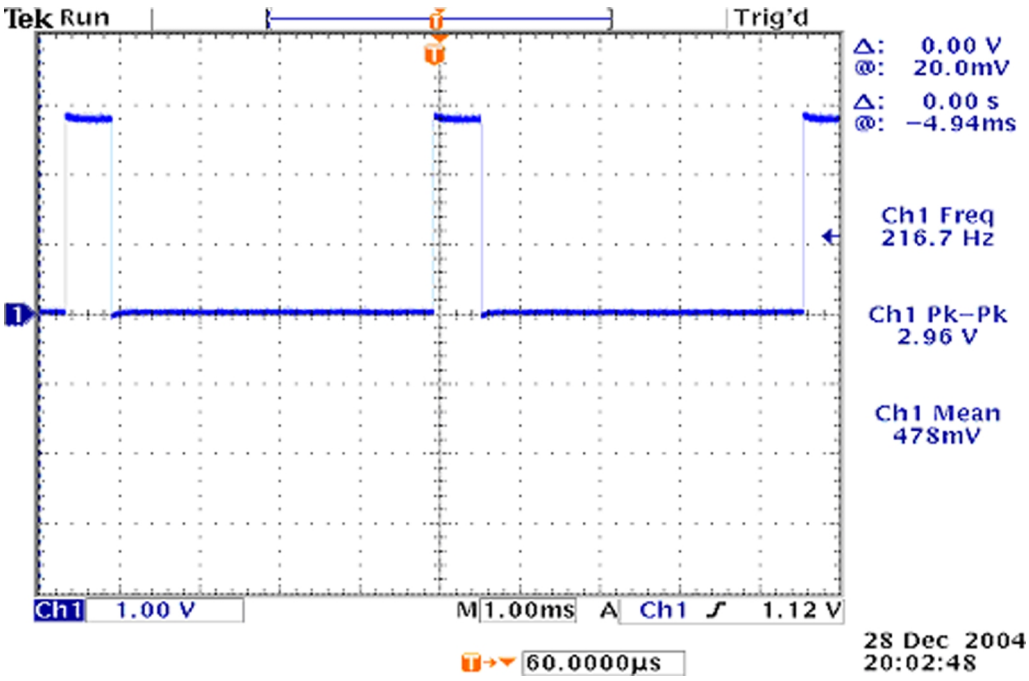

Figure 115 VC1, VC3 signal

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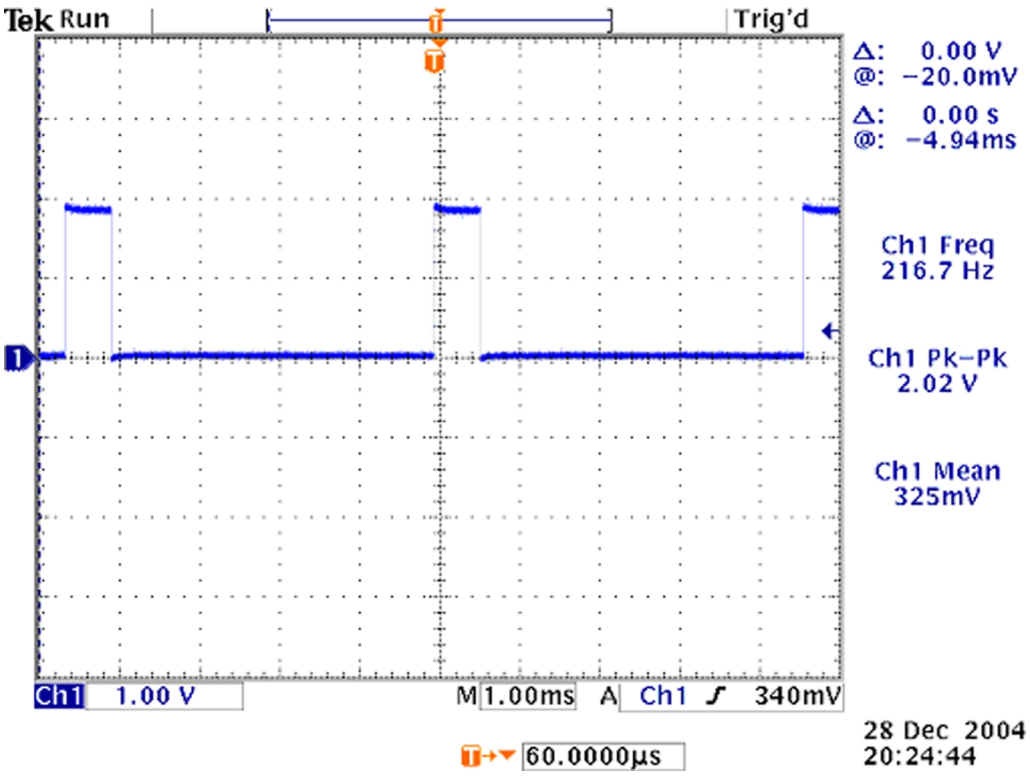

Figure 116 TXP signal

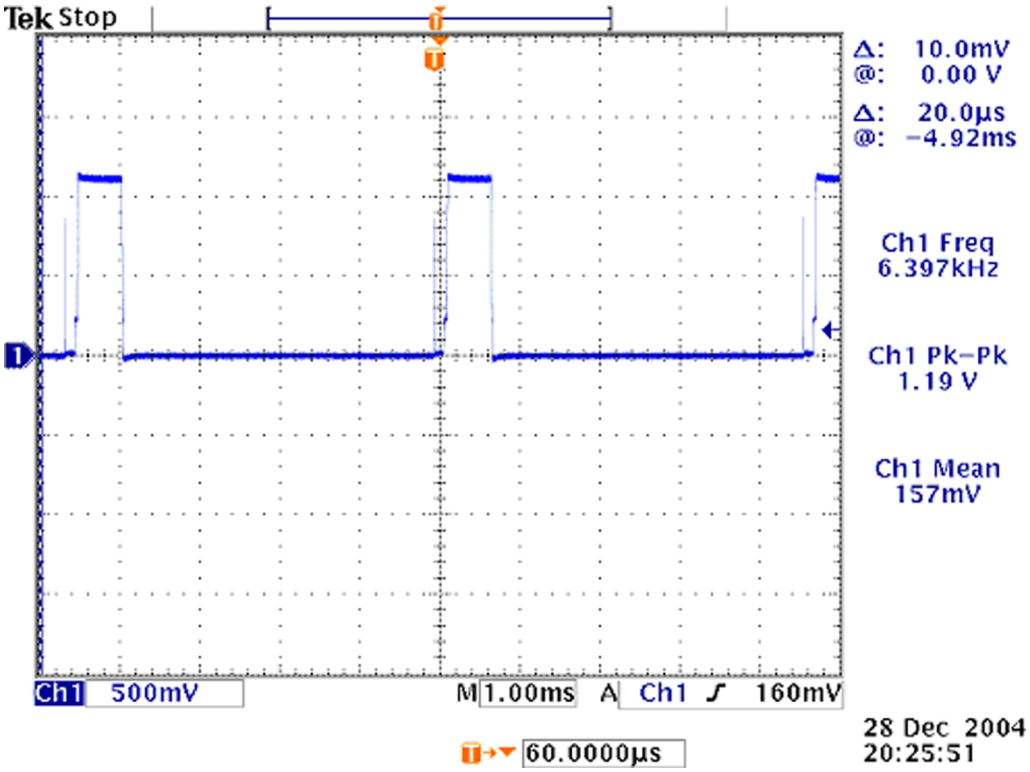

Figure 117 TXC signals at PCL5

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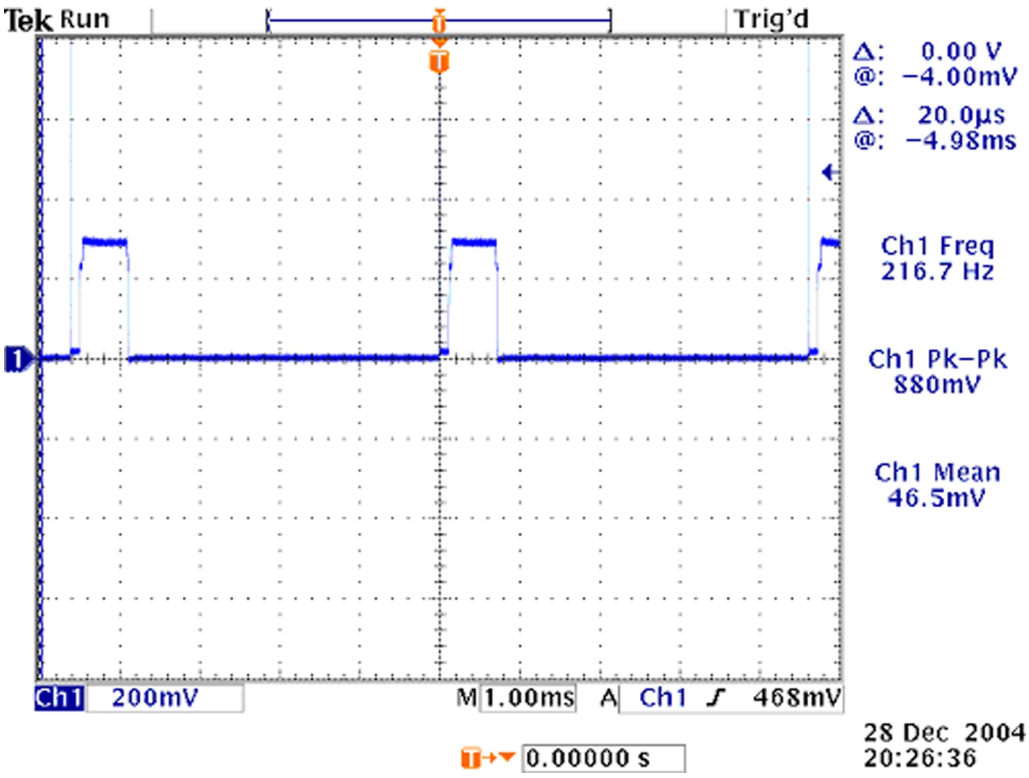

Figure 118 TXC signals at PCL19

GSM850 TX output power

Measure the output power of the phone; it should be about 32.5 dBm. Remember the cable loss is about 0.3 dB.

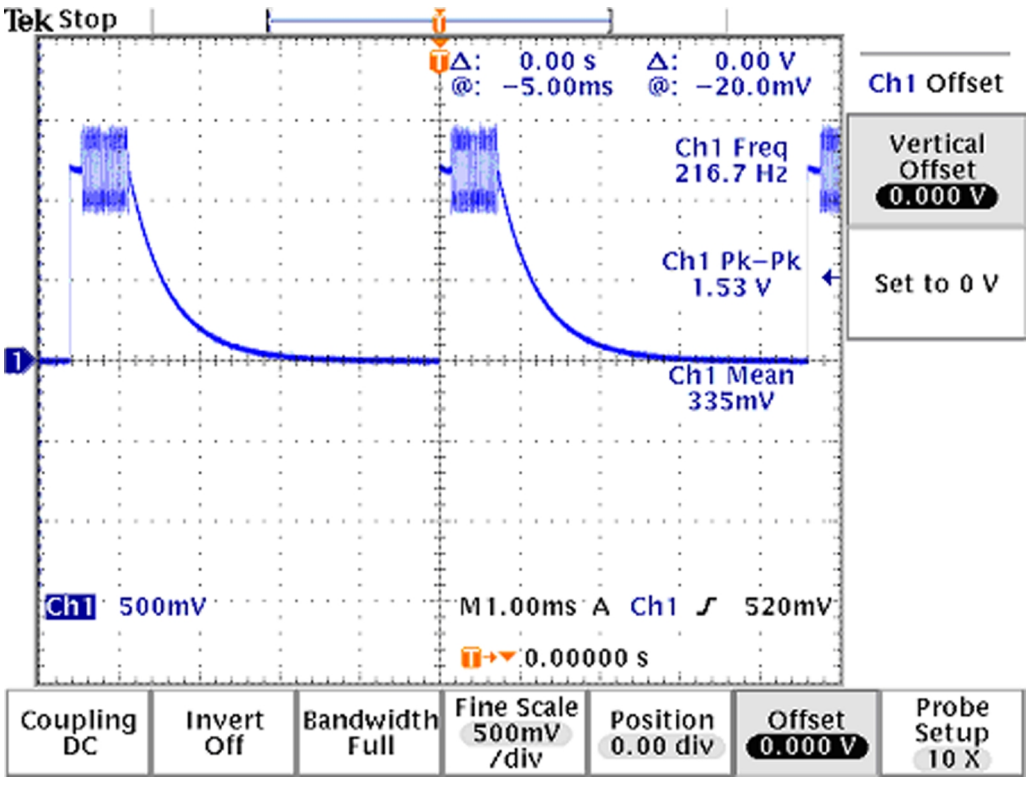

Figure 119 TX I/O signal

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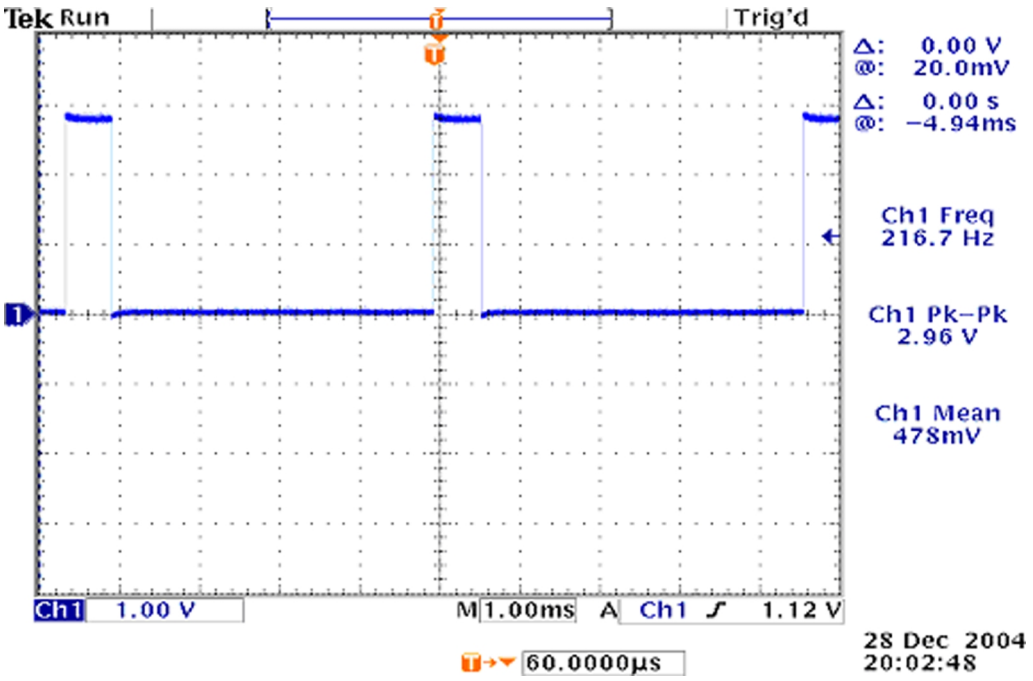

Figure 120 VC1, VC3 signal

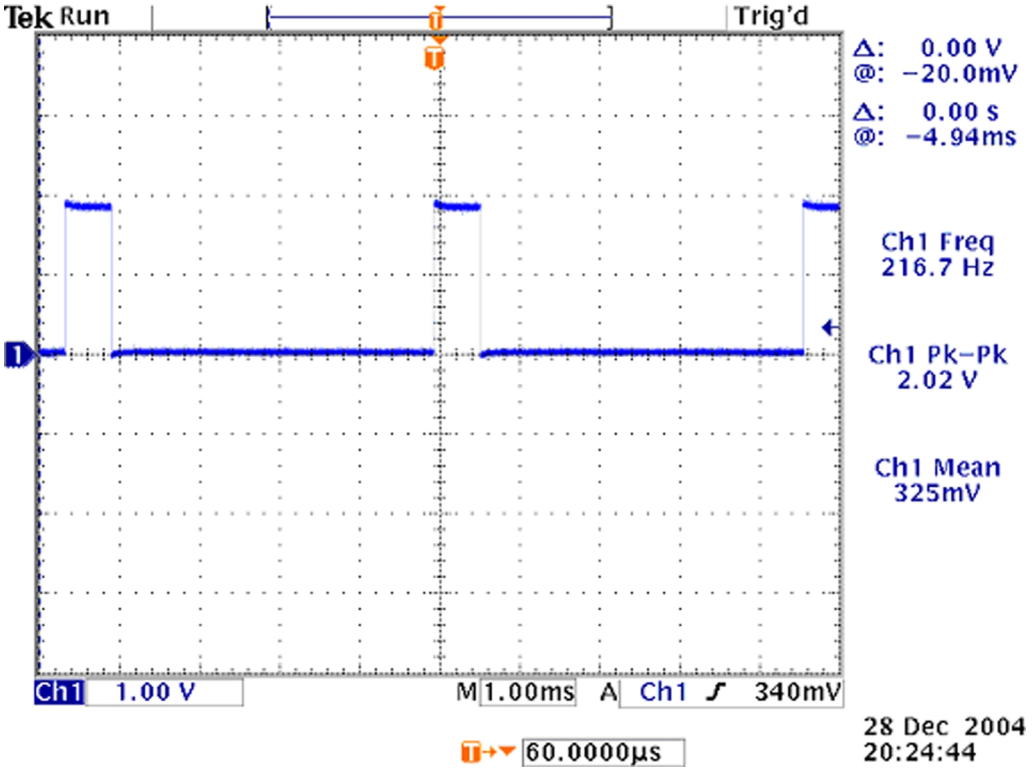

Figure 121 TXP signal

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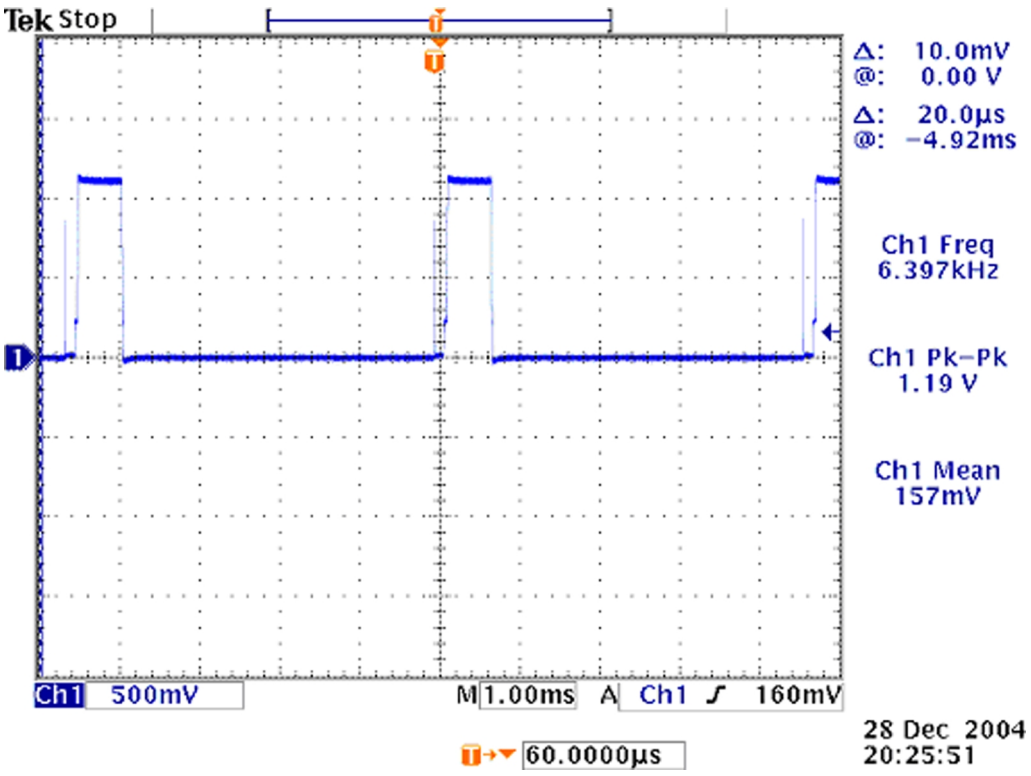

Figure 122 TXC signals at PCL5

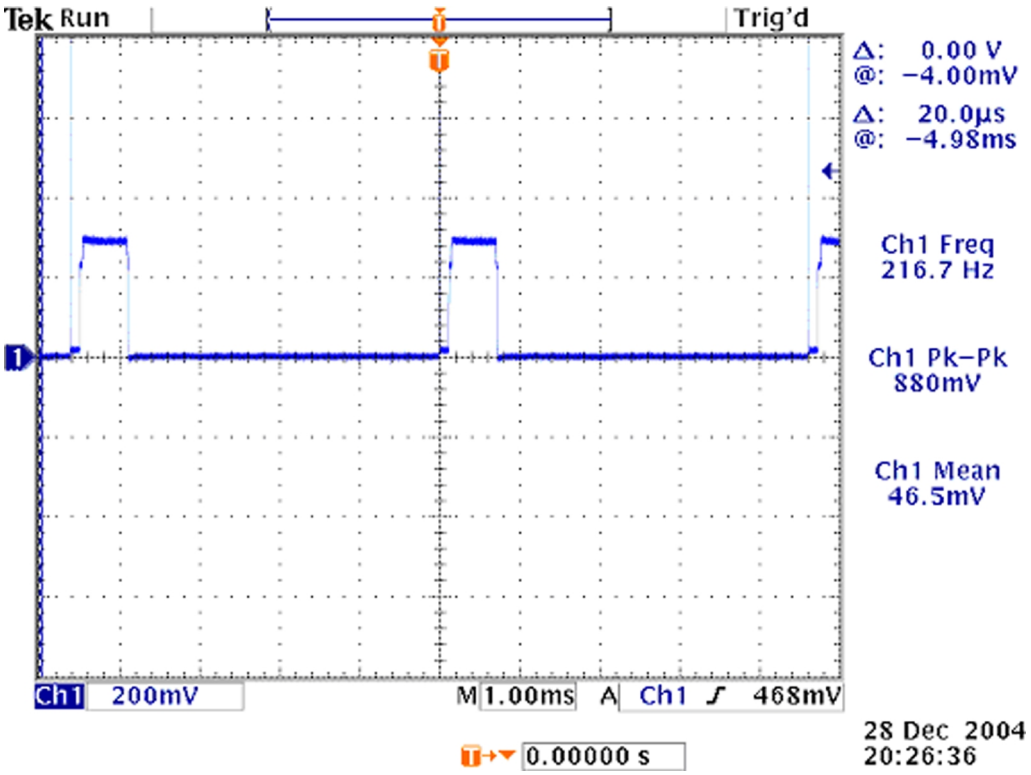

Figure 123 TXC signals at PCL19

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General instructions for GSM1900 TX troubleshooting

Steps

1. Apply a RF-cable to the RF-connector to allow the transmitted signal act as normal. RF-cable should be connected to an attenuator at least 10dB before connected to the measurement equipment, otherwise the PA may be damaged.
2. Start *Phoenix* and establish a connection to the phone with the data cable e.g. FBUS.
3. Select File and Scan product.
4. Wait a while for the PC to read the information from the phone.
5. Select Testing and RF Controls.
6. Set the parameters as follows:
   i Band: GSM 1900
   ii Active Unit: RX
   iii TX Power Level: 0
   iv TX Data Type: Random
7. The setup should now look like this:

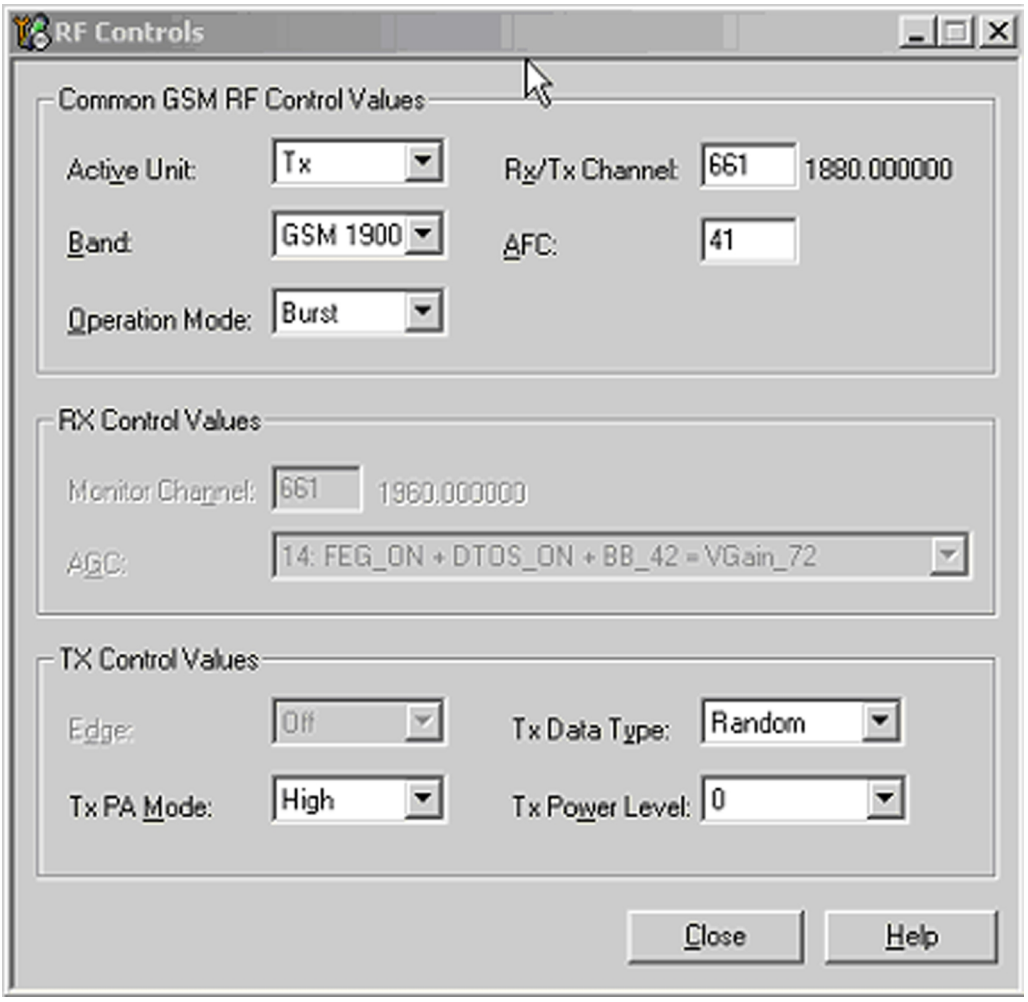

Figure 124 GSM 1900 RF controls window

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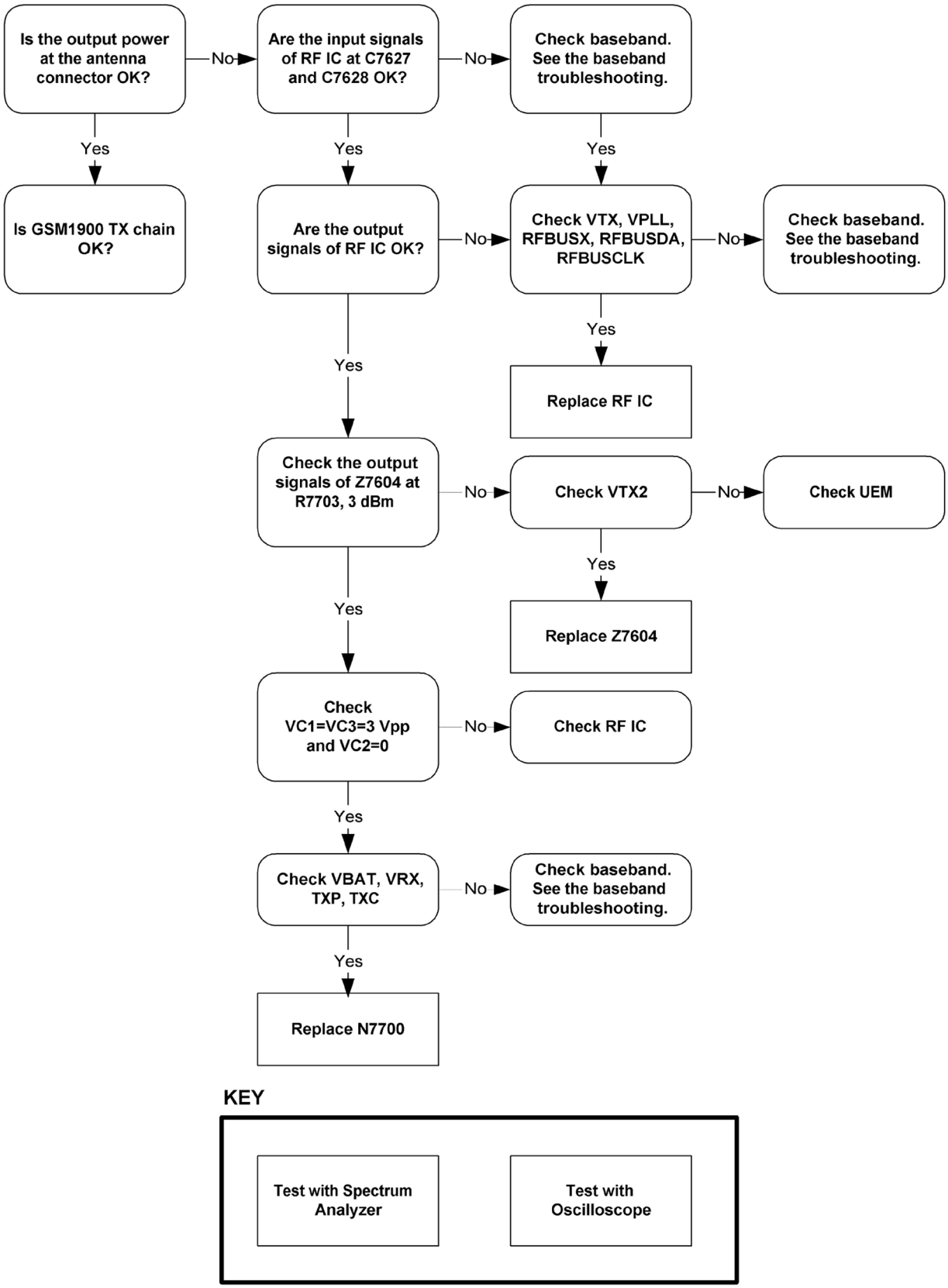
Troubleshooting diagram for GSM 1900 transmitter

GSM 1900 TX output power



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Measure the output power of the phone; it should be about 29.5dBm. Remember the cable loss is about 0.5dB.

Results

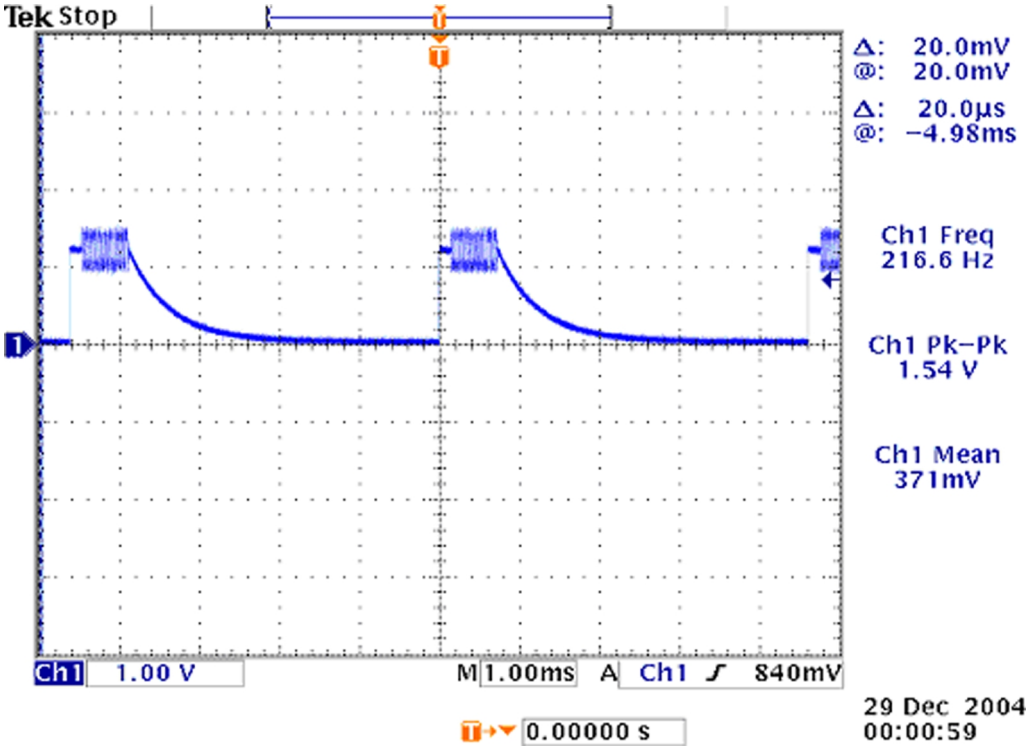

Figure 125 TX I/O signal

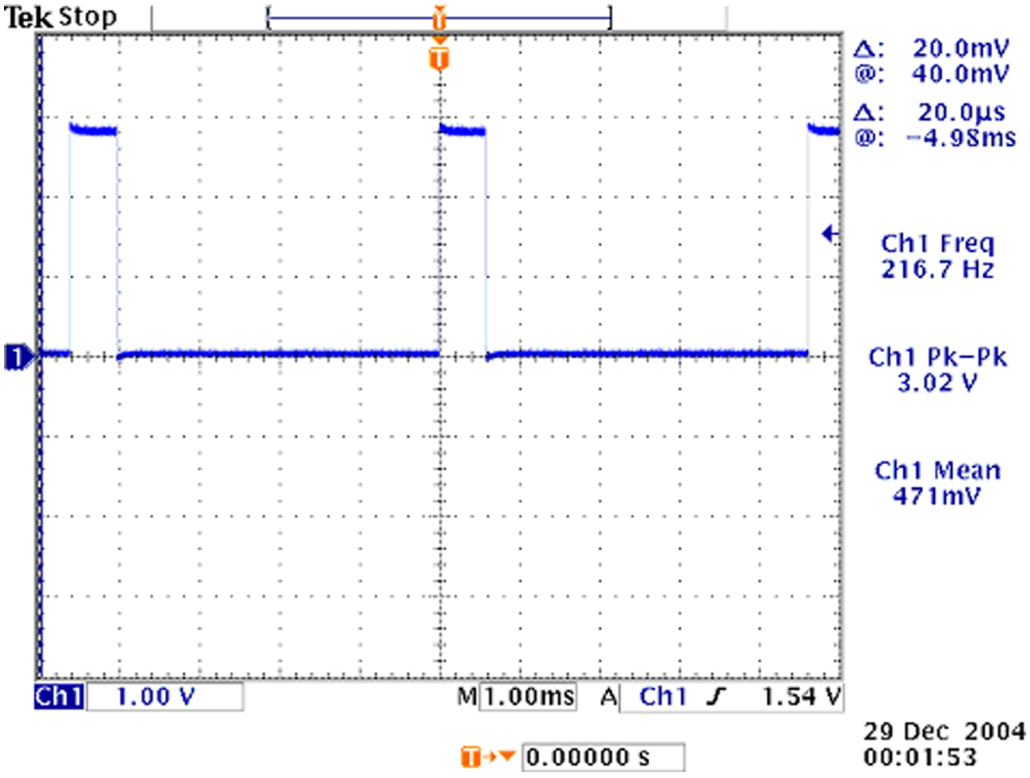

Figure 126 VC1, VC2, VC3 signals

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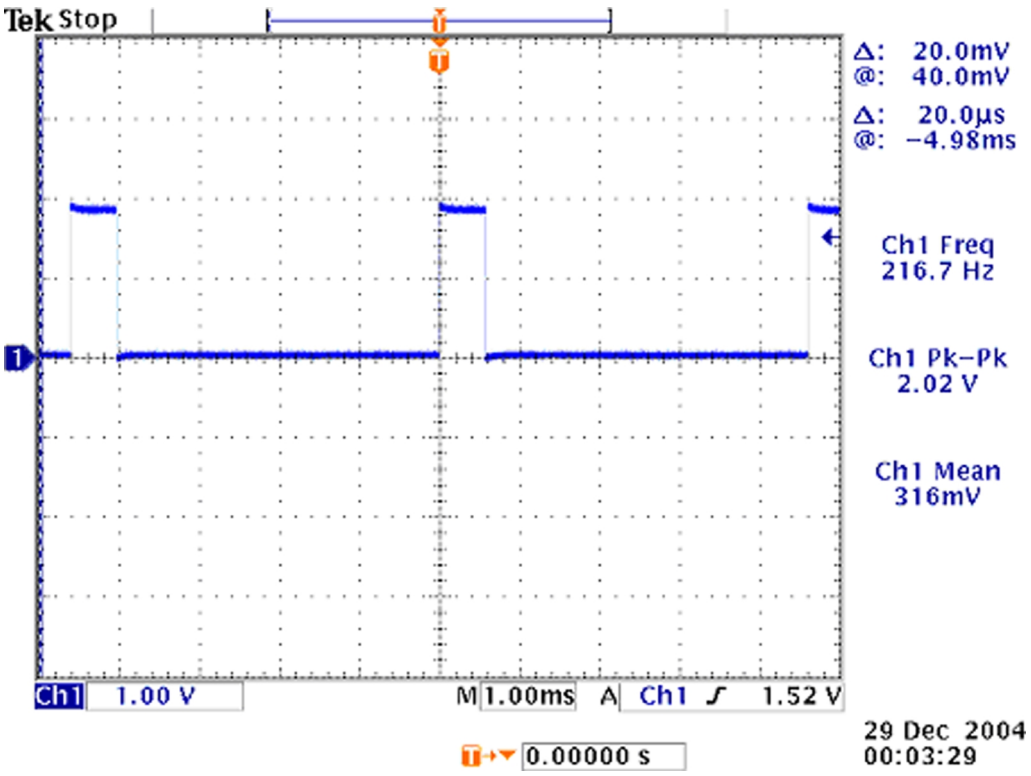

Figure 127 TXP signal

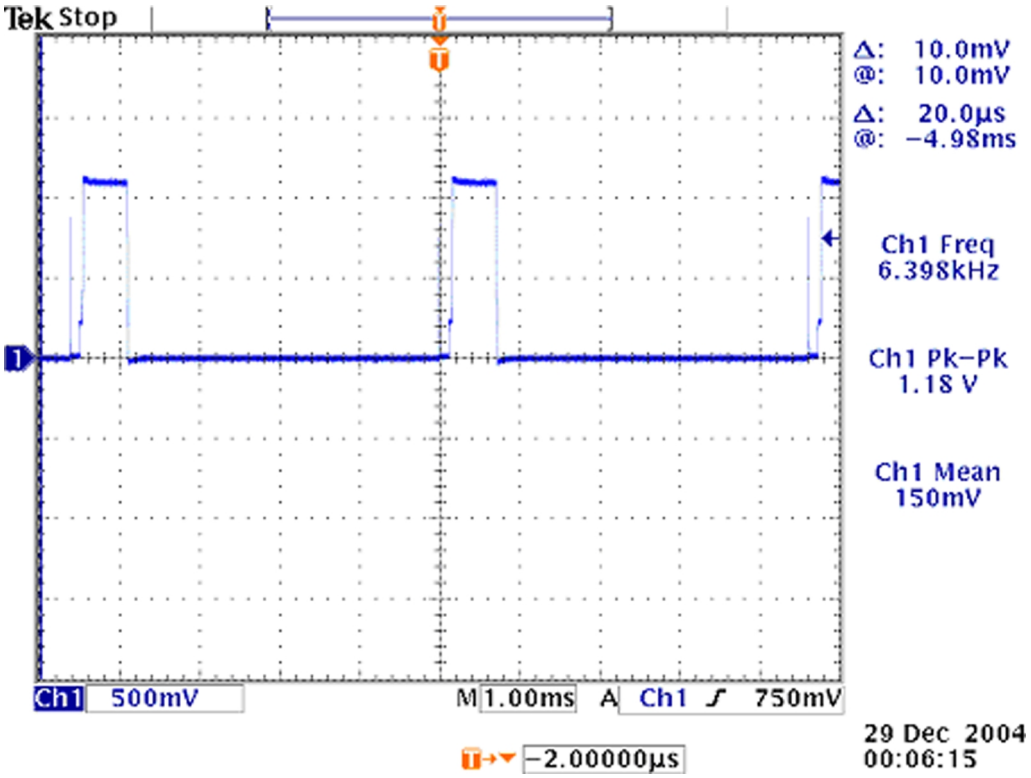

Figure 128 TXC signals at PCL0

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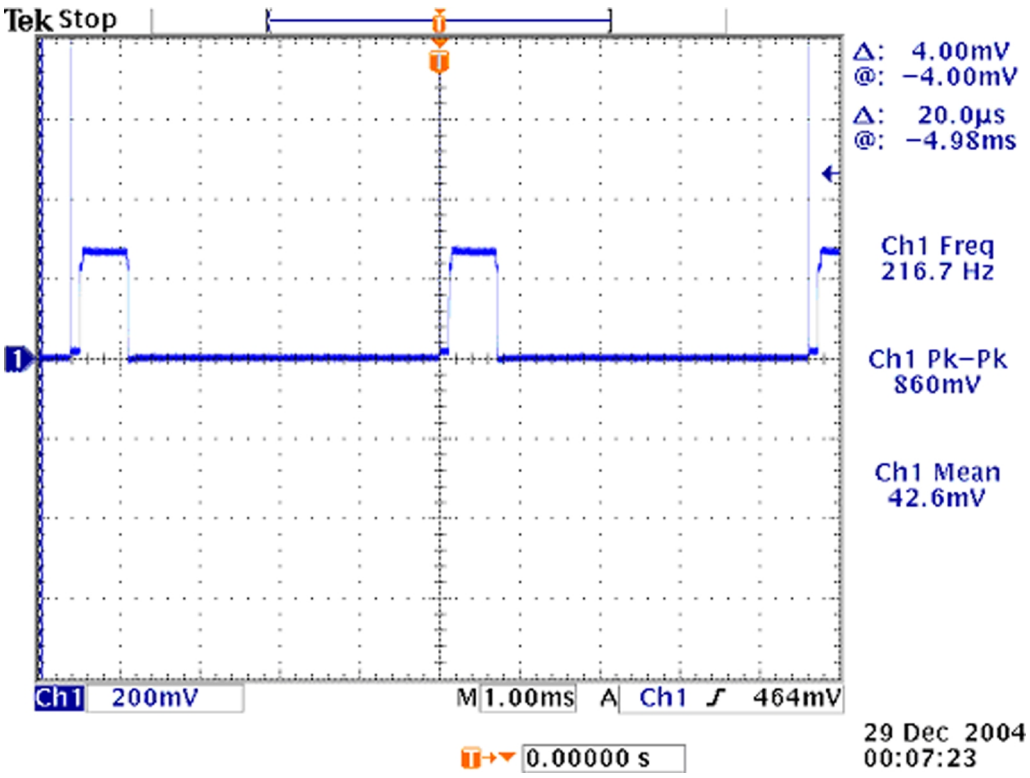

Figure 129 TXC signals at PCL15

GSM1900 TX output power

Measure the output power of the phone; it should be about 29.5 dBm. Remember the cable loss is about 0.5 dB.

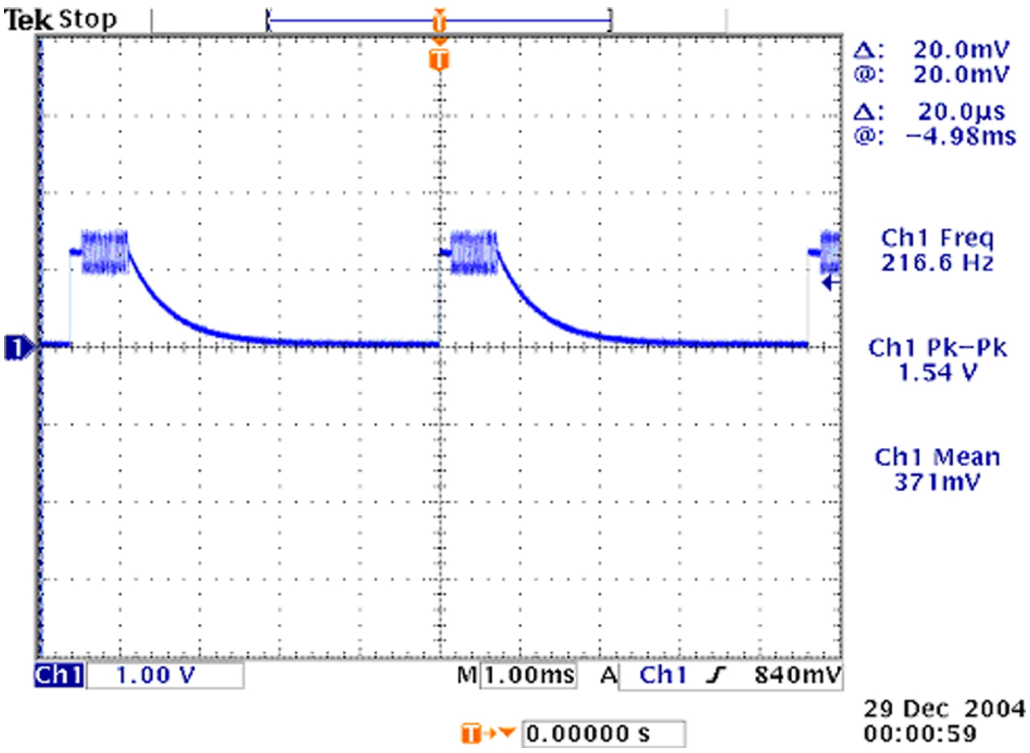

Figure 130 TX I/O signal

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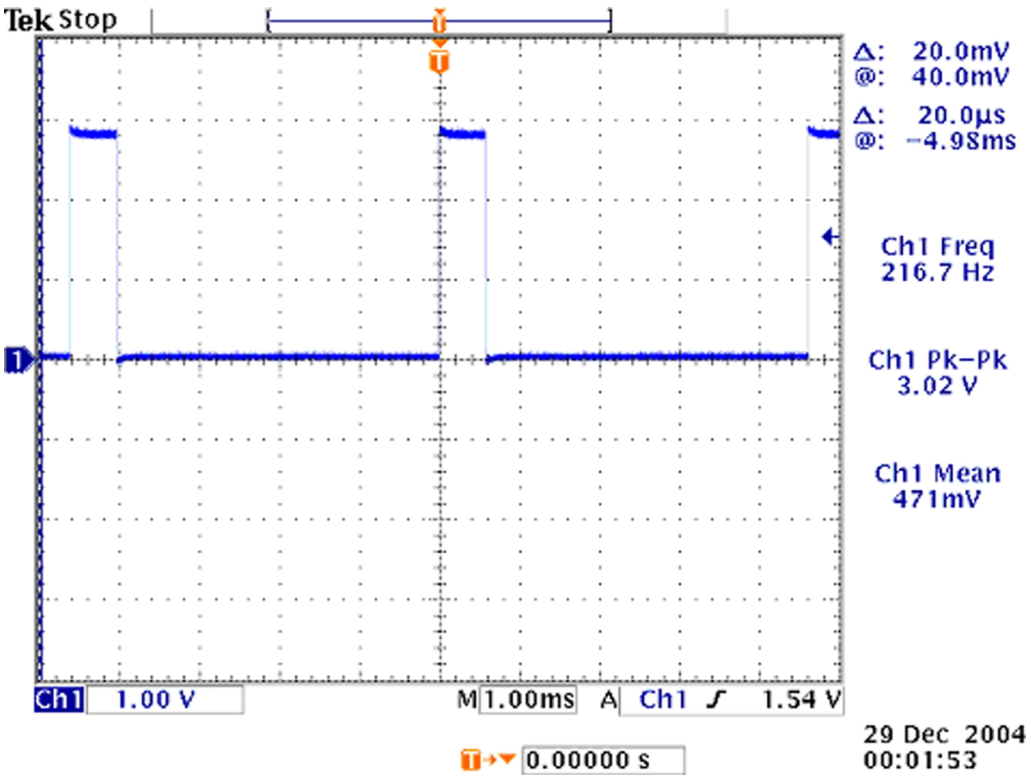

Figure 131 VC1, VC2, VC3 signals

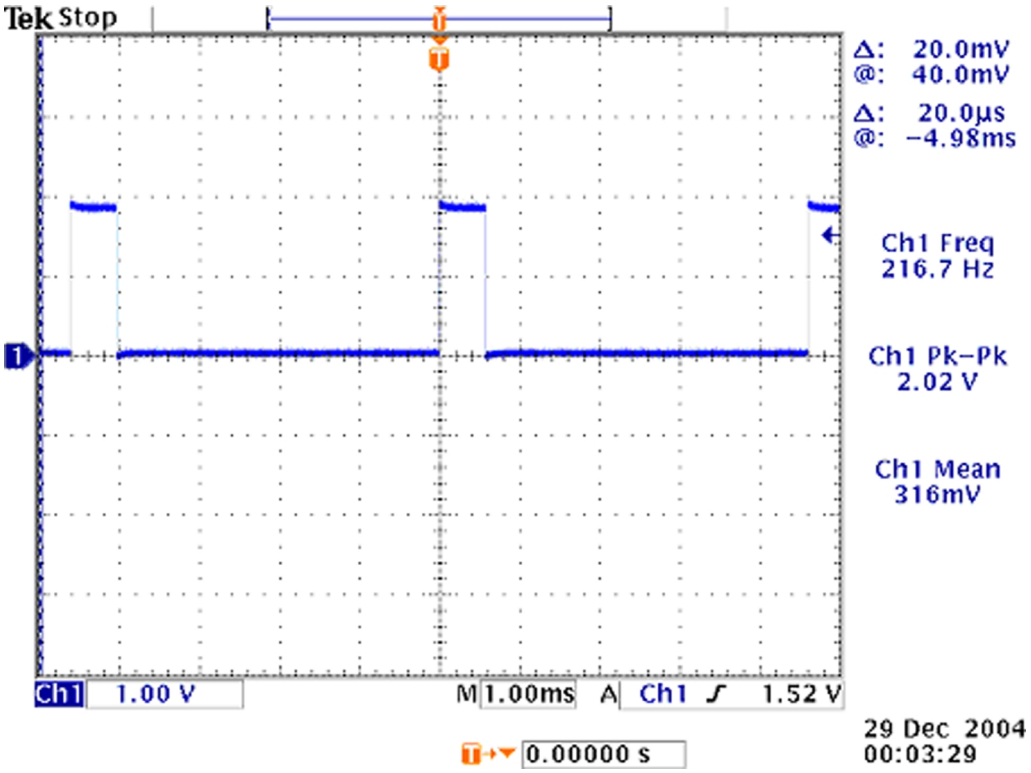

Figure 132 TXP signal

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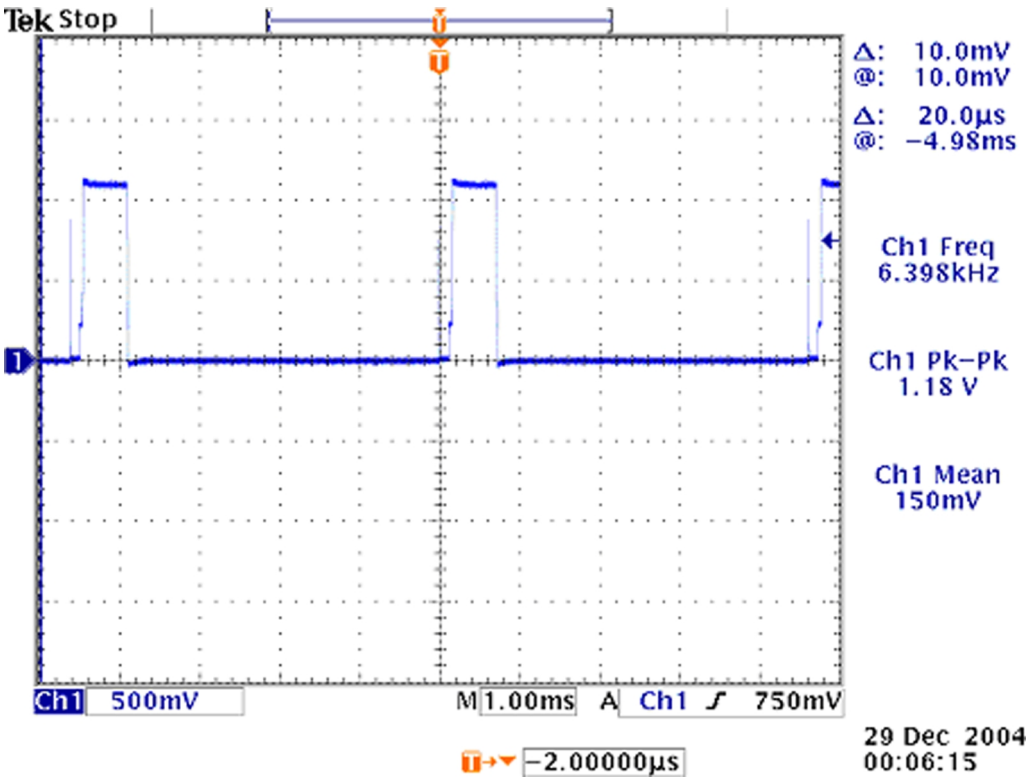

Figure 133 TXC signals at PCL0

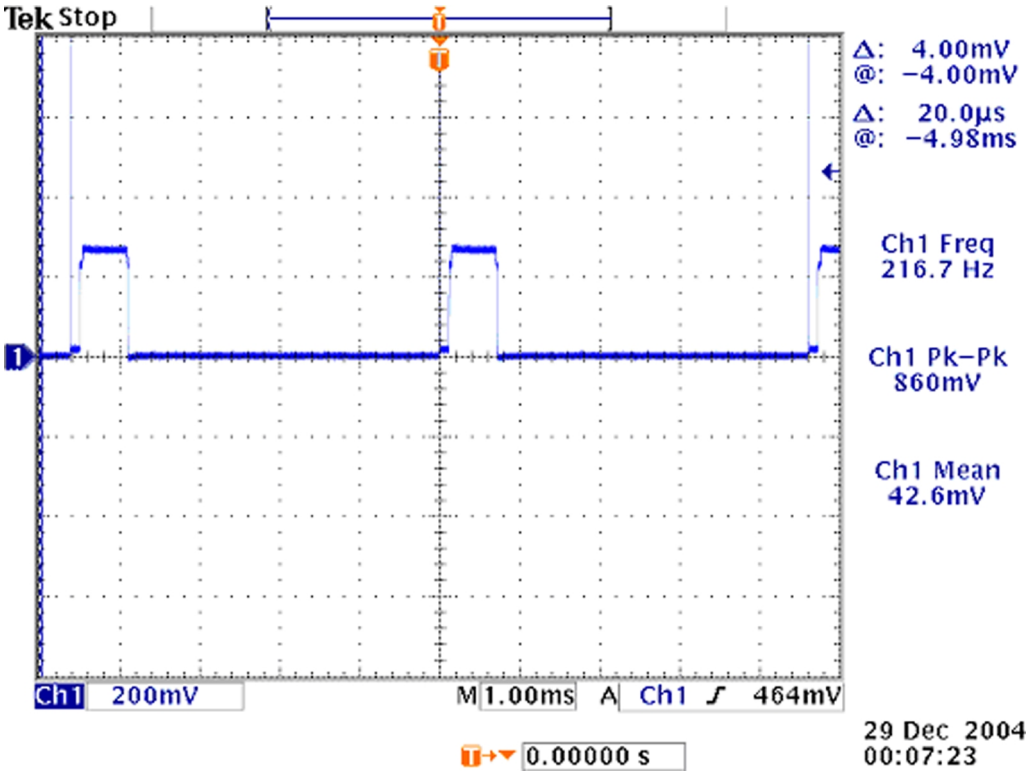

Figure 134 TXC signals at PCL15

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General instructions for GSM 900 TX troubleshooting

Steps

1. Apply a RF-cable to the RF-connector to allow the transmitted signal act as normal. RF-cable should be connected to an attenuator at least 10dB before connected to the measurement equipment, otherwise the PA may be damaged.
2. Start *Phoenix* and establish a connection to the phone with the data cable e.g. FBUS.
3. Select File and Scan product.
4. Wait a while for the PC to read the information from the phone.
5. Select Testing and RF Controls.
6. Set the parameters as follows:
   i Band: GSM 900
   ii Active Unit: RX
   iii TX Power Level: 5
   iv TX Data Type: Random

Results

The setup should now look like this:

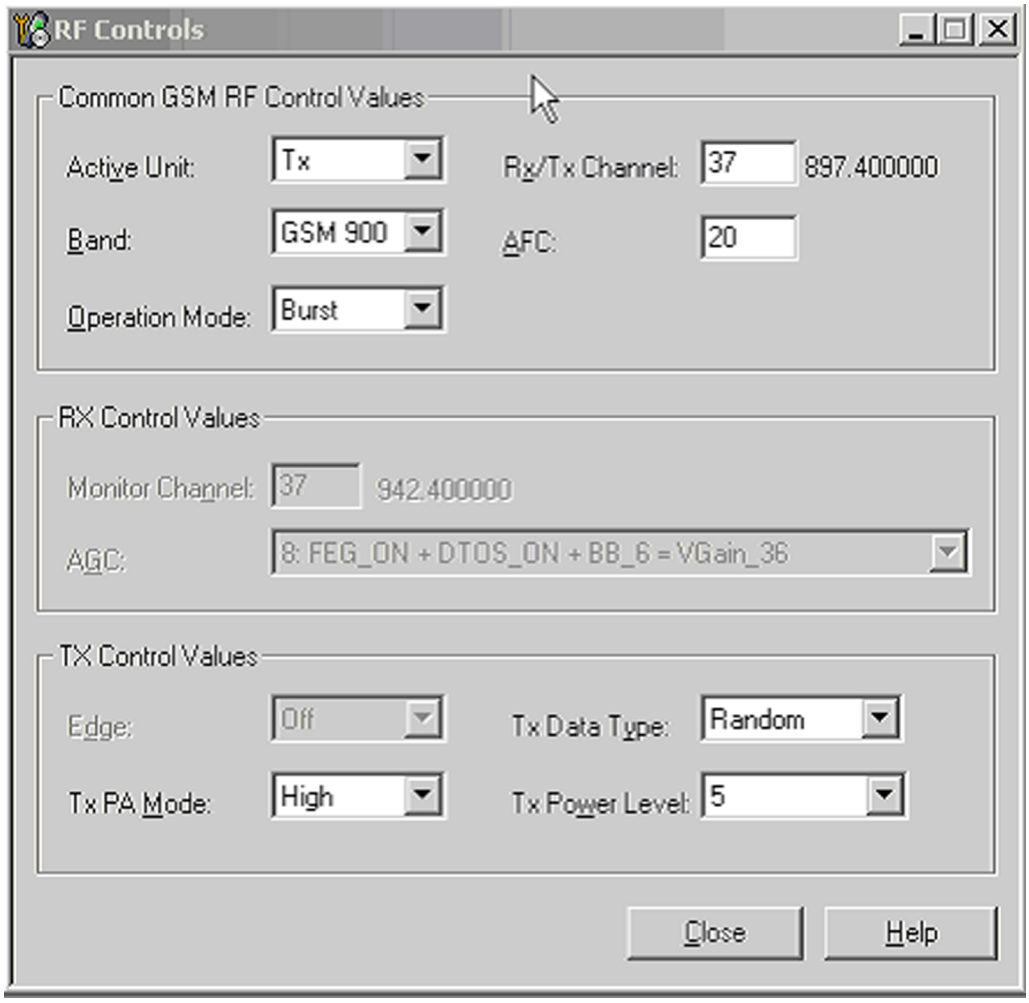

Figure 135 GSM 900 RF controls window

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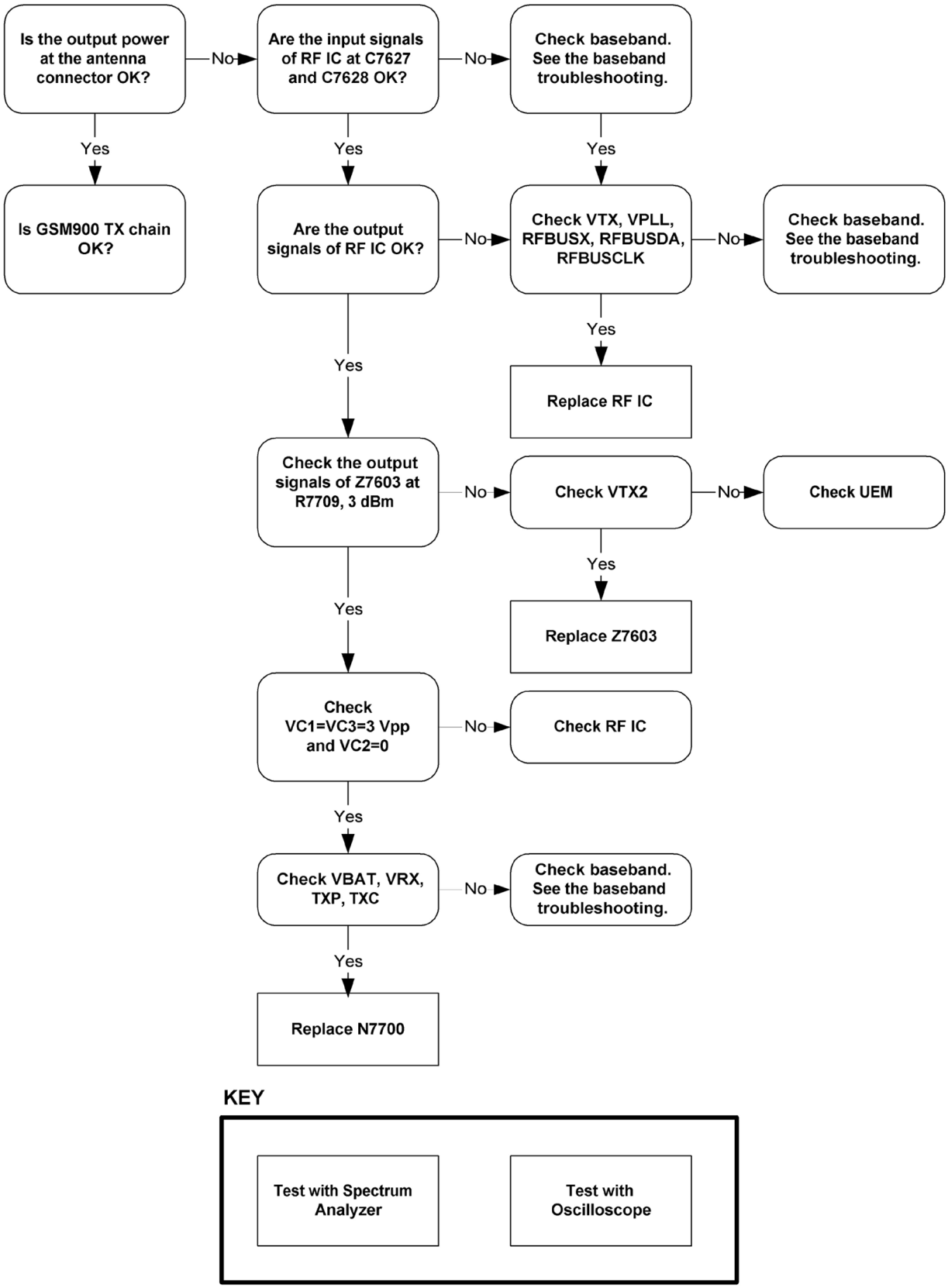
Troubleshooting diagram for GSM 900 transmitter

GSM 900 TX output power



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Measure the output power of the phone; it should be about 32.5dBm. Remember the cable loss is about 0.3dB.

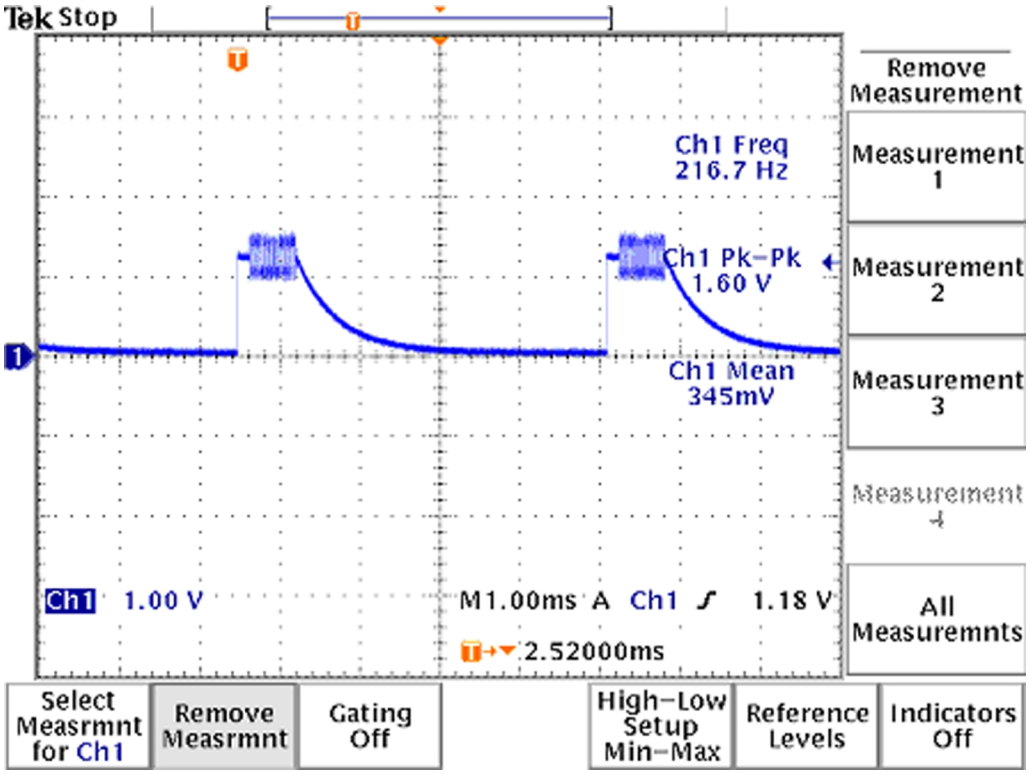

Figure 136 TX I/O signal

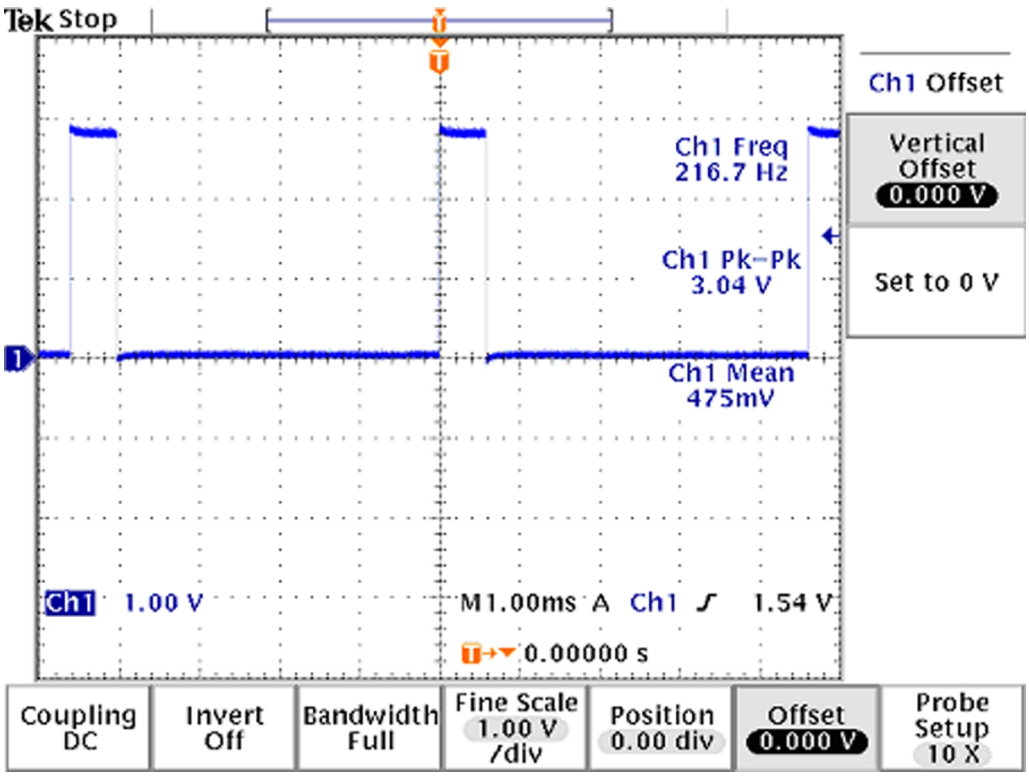

Figure 137 VC1, VC3 signals

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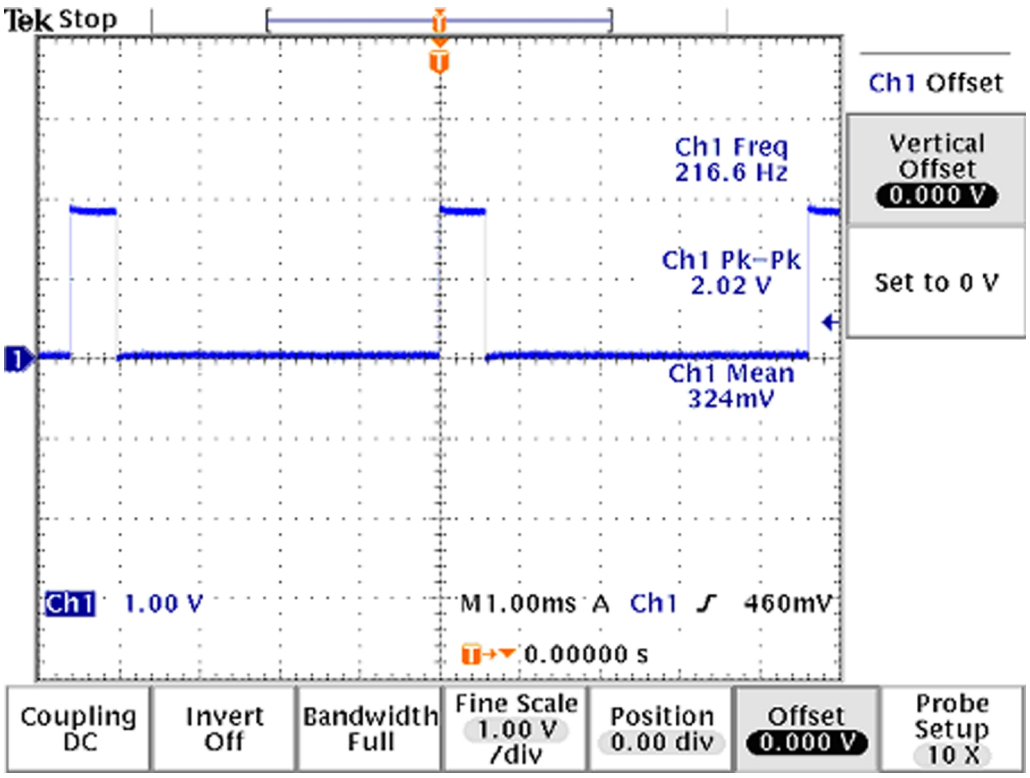

Figure 138 TXP signal

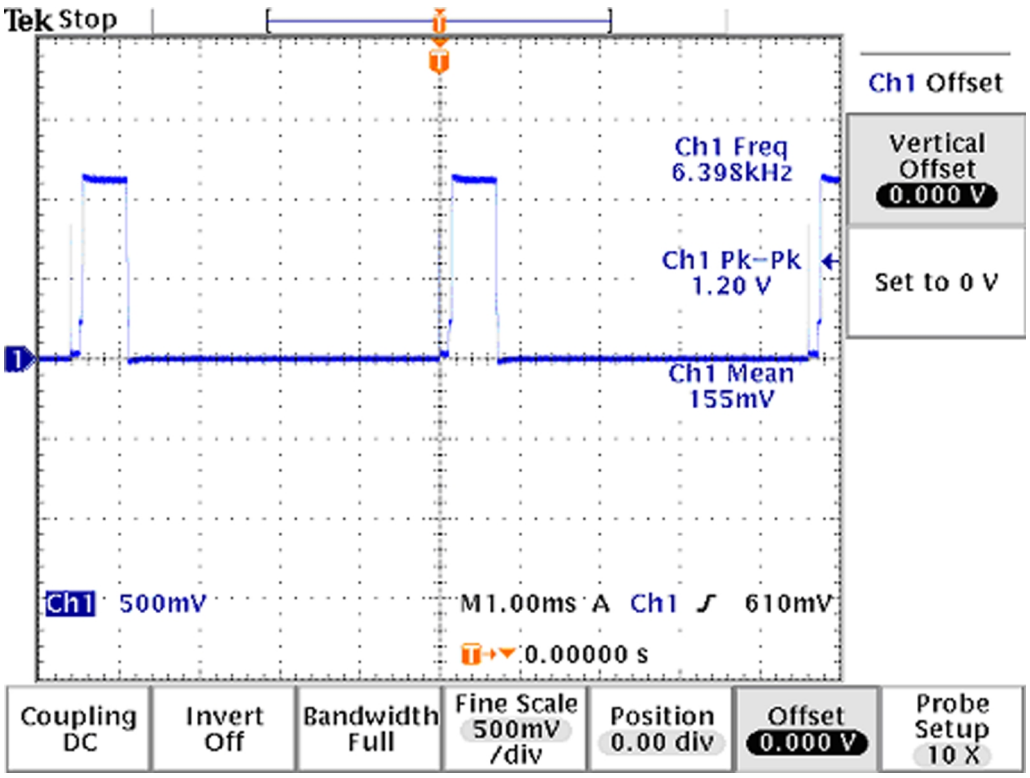

Figure 139 TXC signals at PCL5

GSM900 TX output power

Measure the output power of the phone; it should be about 32.5 dBm. Remember the cable loss is about 0.3 dB.

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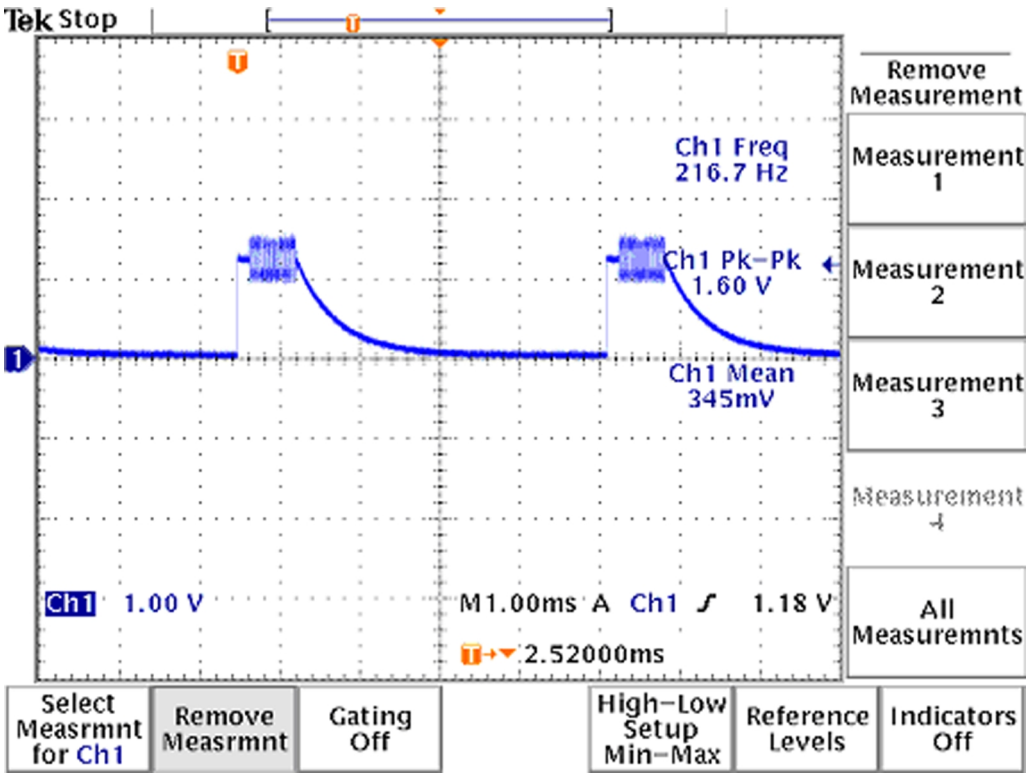

Figure 140 TX I/O signal

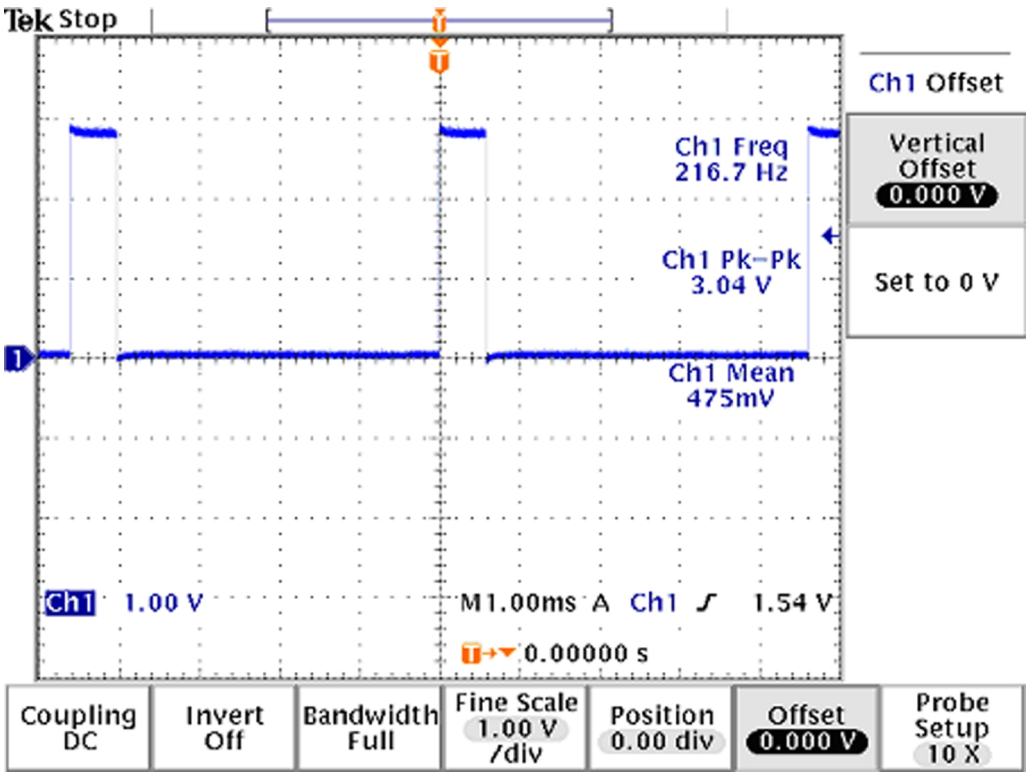

Figure 141 VC1, VC3 signals

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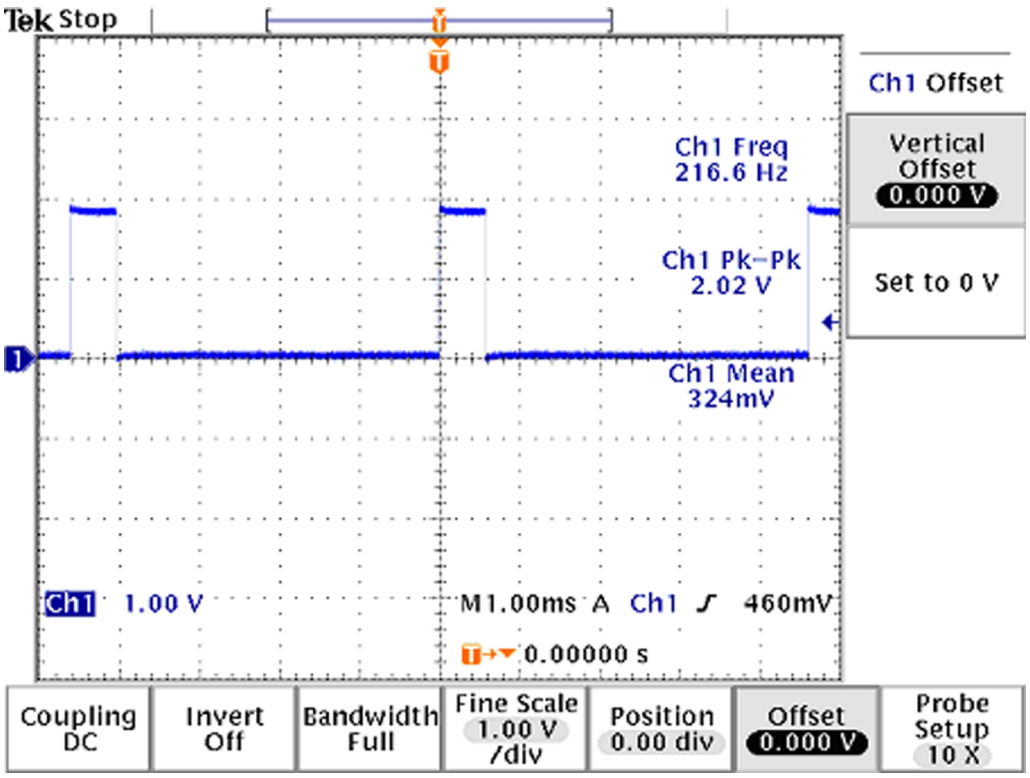

Figure 142 TXP signal

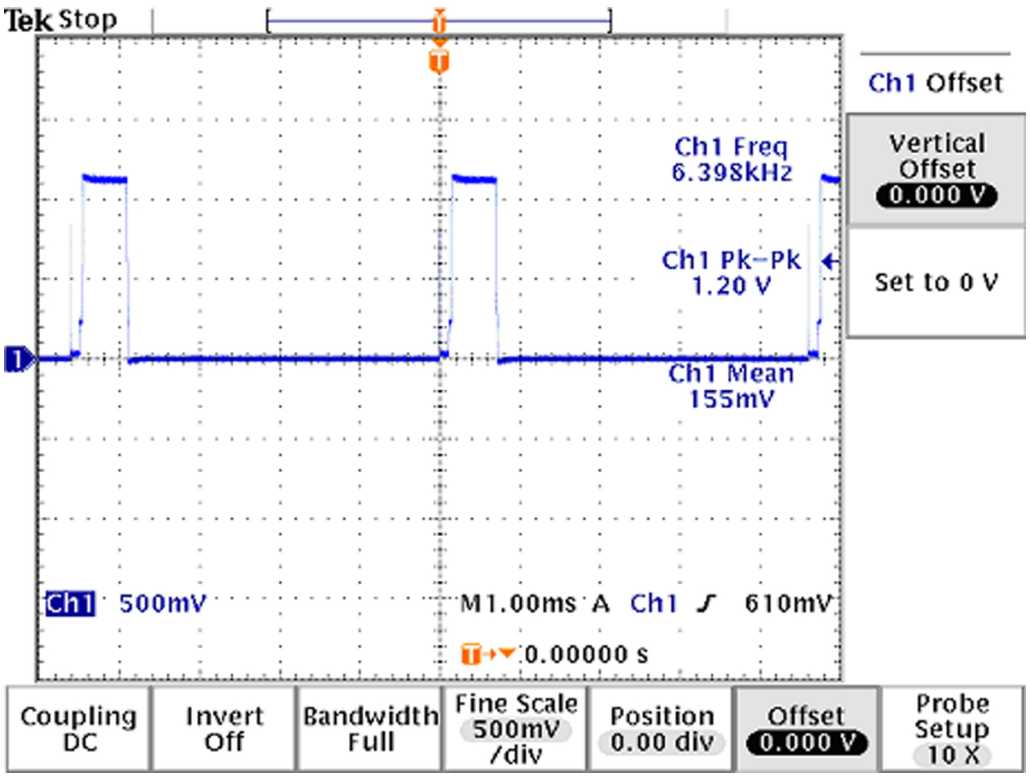

Figure 143 TXC signals at PCL5

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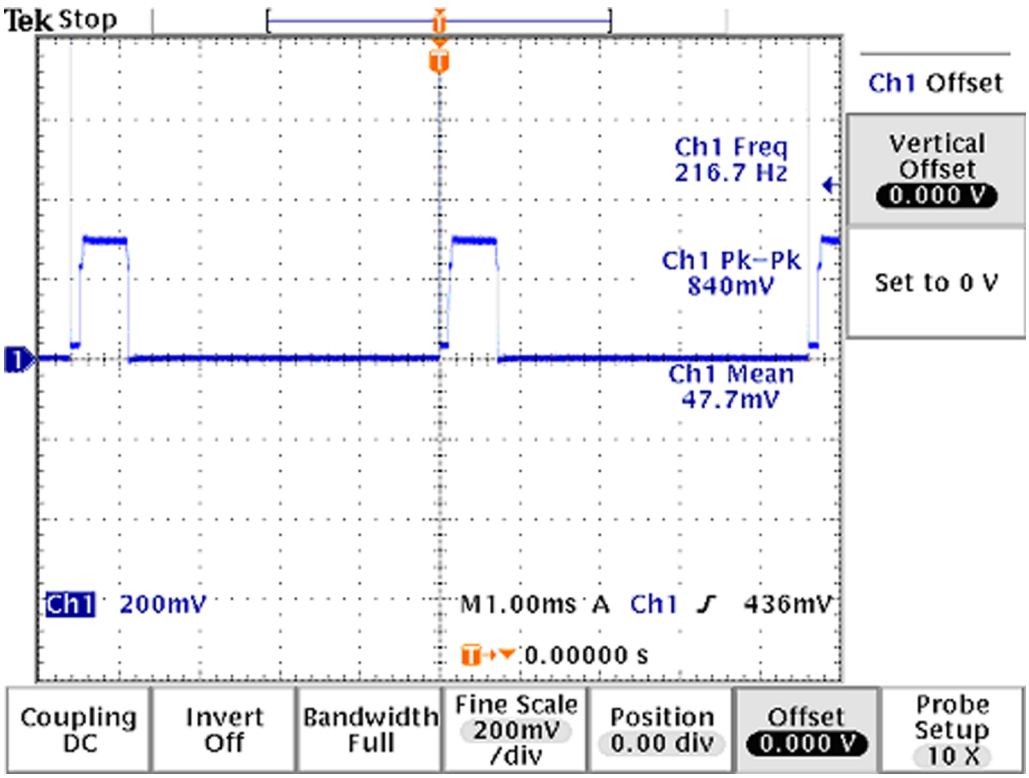

Figure 144 TXC signals at PCL19

General instructions for GSM1800 TX troubleshooting

Steps

1. Apply a RF-cable to the RF-connector to allow the transmitted signal act as normal. RF-cable should be connected to an attenuator at least 10dB before connected to the measurement equipment, otherwise the PA may be damaged.
2. Start *Phoenix* and establish a connection to the phone with the data cable e.g. FBUS.
3. Select File and Scan product.
4. Wait a while for the PC to read the information from the phone.
5. Select Testing and RF Controls.
6. Set the parameters as follows:
   i Band: GSM 1800
   ii Active Unit: RX
   iii TX Power Level: 0
   iv TX Data Type: Random

Results

The setup should now look like this:

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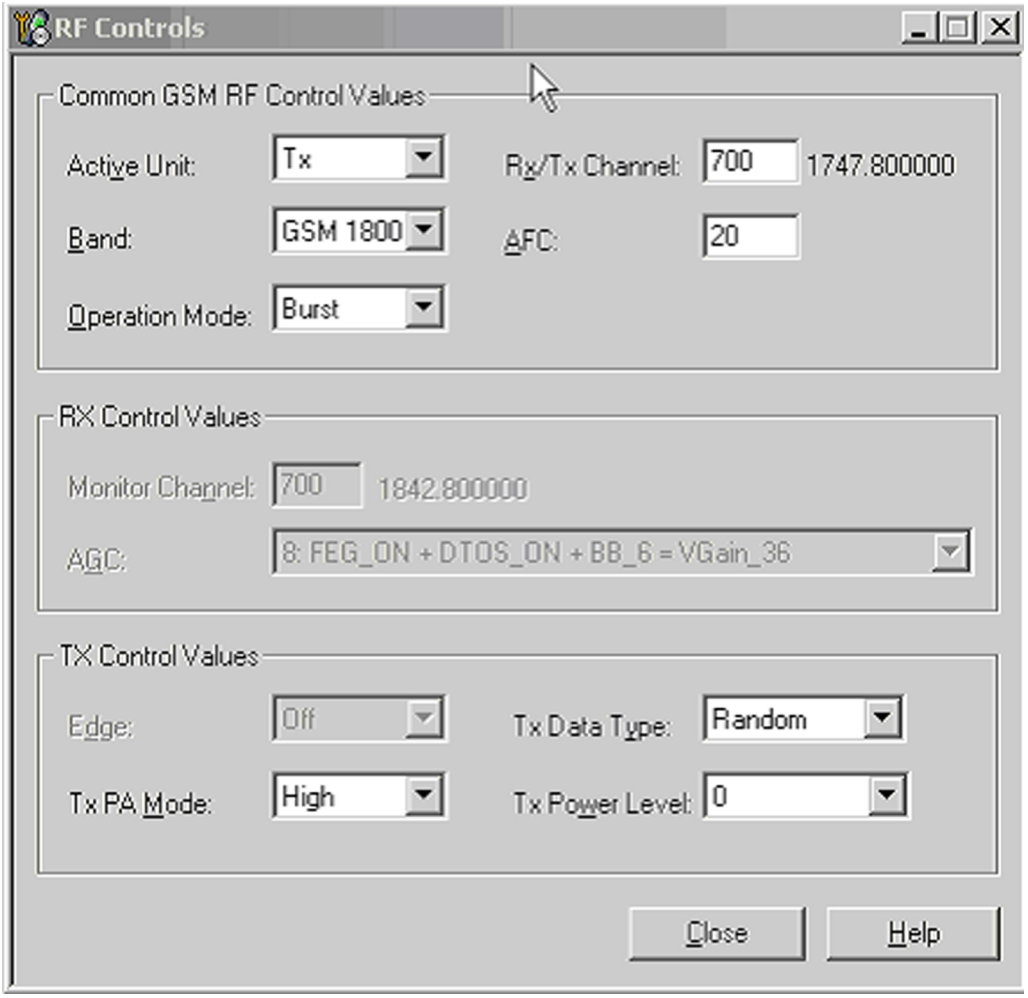

Figure 145 GSM 1800 RF controls window

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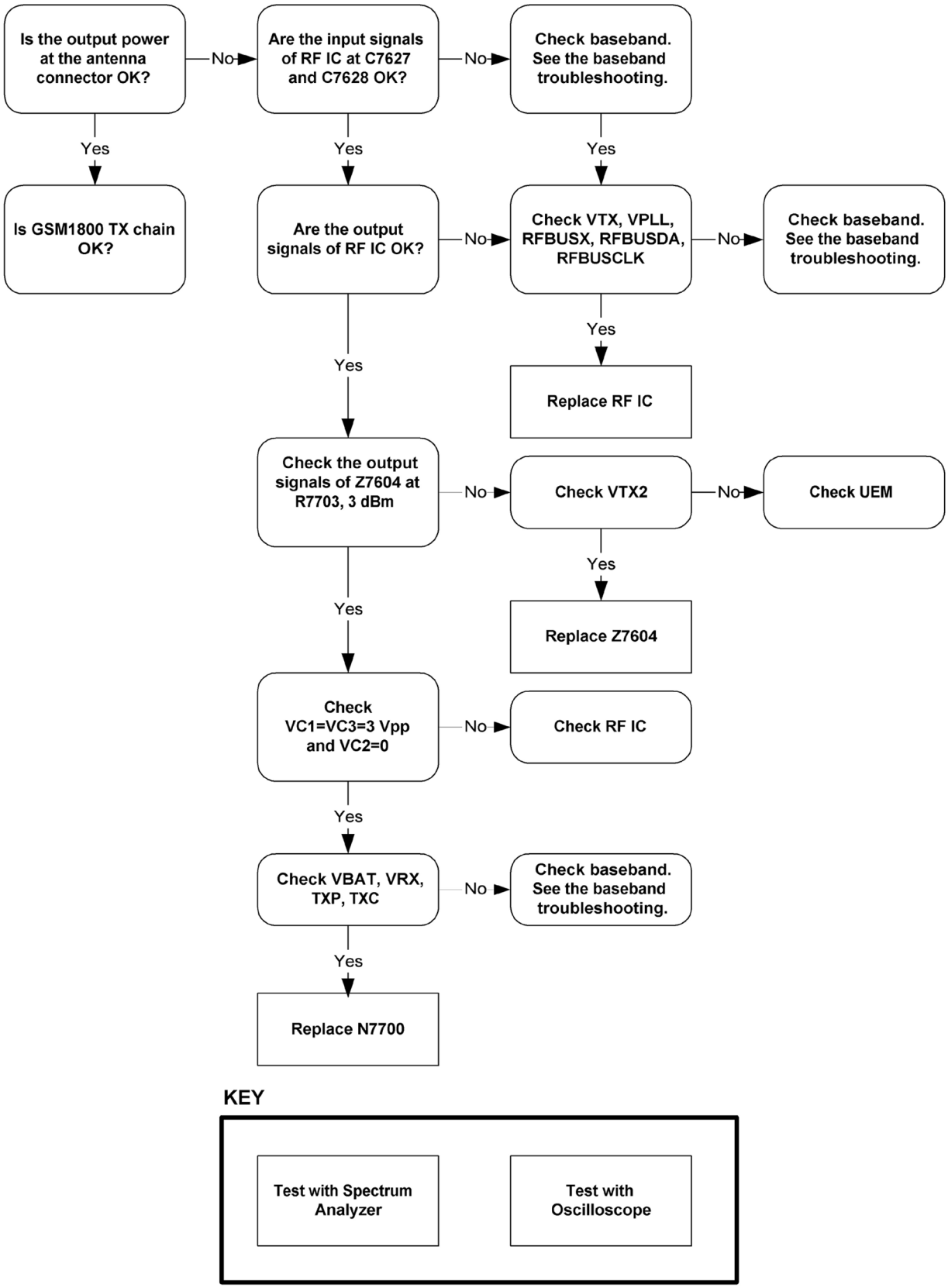
Troubleshooting diagram for GSM 1800 transmitter

GSM 1800 TX output power



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Measure the output power of the phone; it should be about 29.5dBm. Remember the cable loss is about 0.5dB.

Results

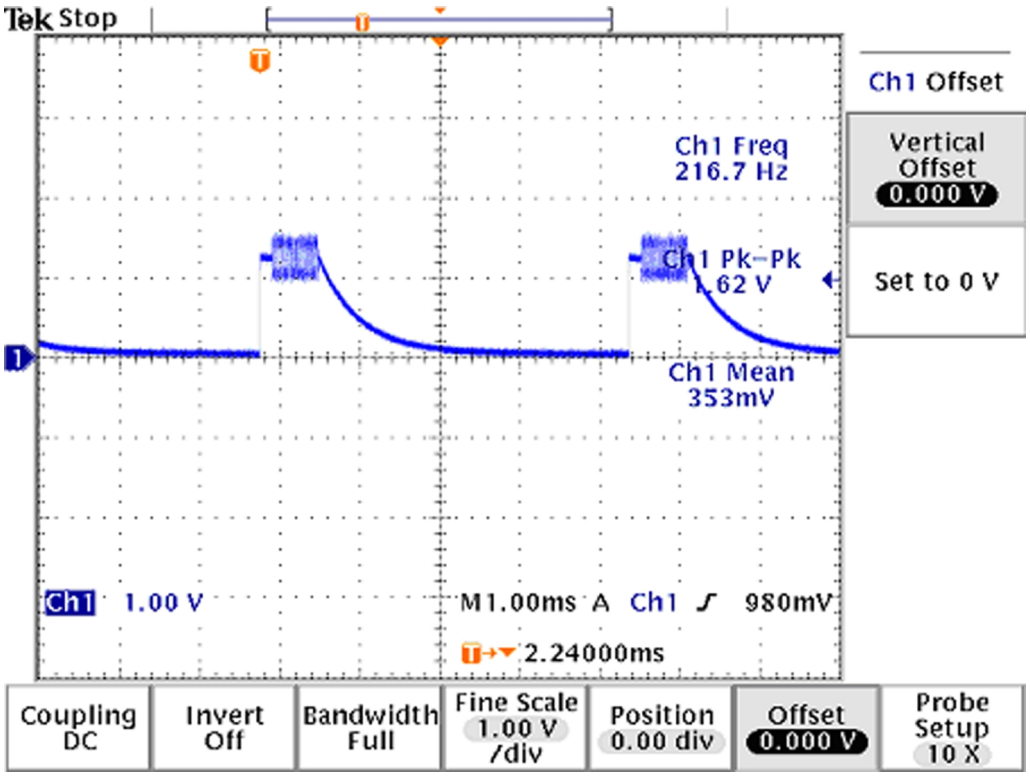

Figure 146 TX I/O signal

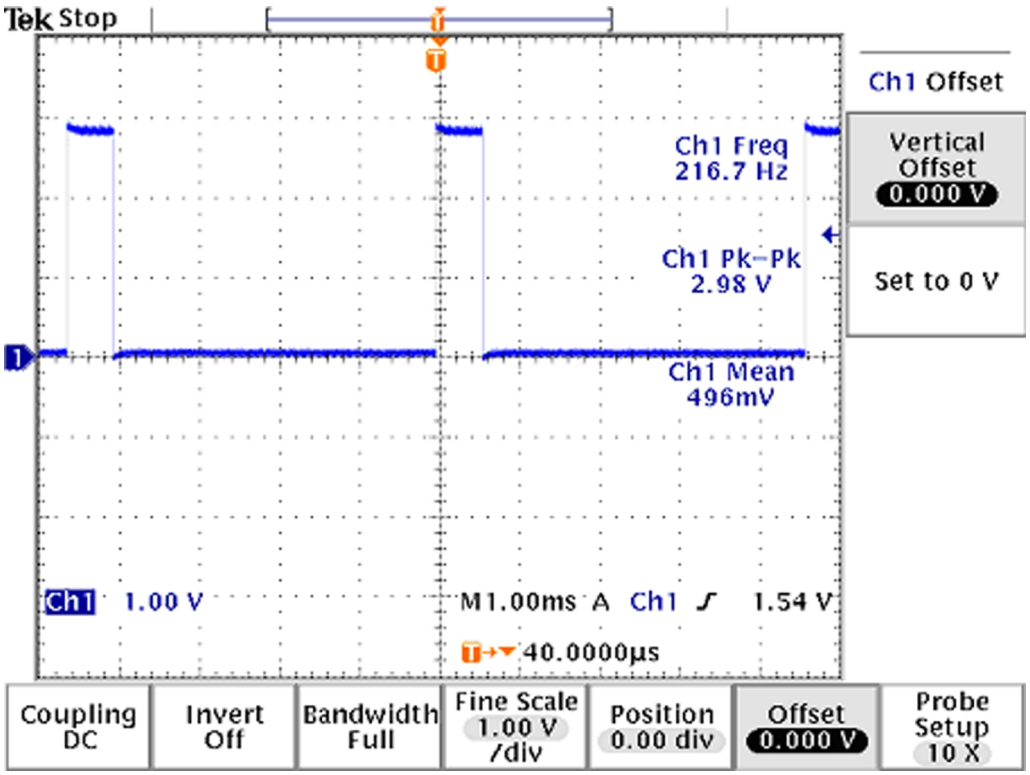

Figure 147 VC1, VC2, VC3 signals

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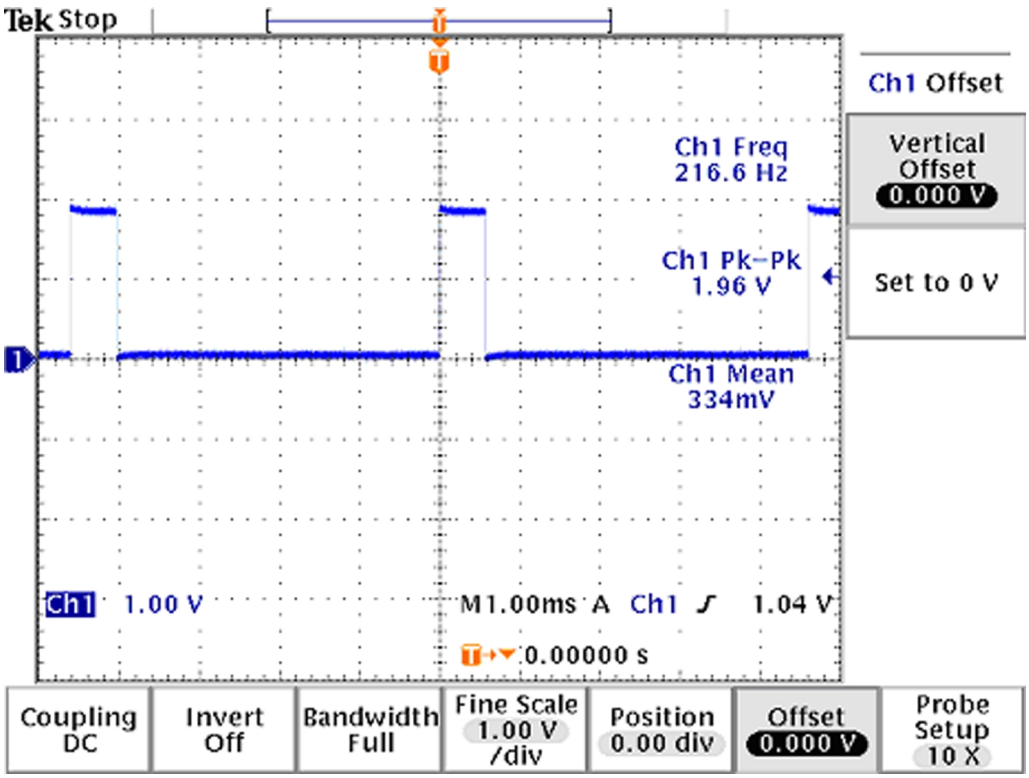

Figure 148 TXP signal

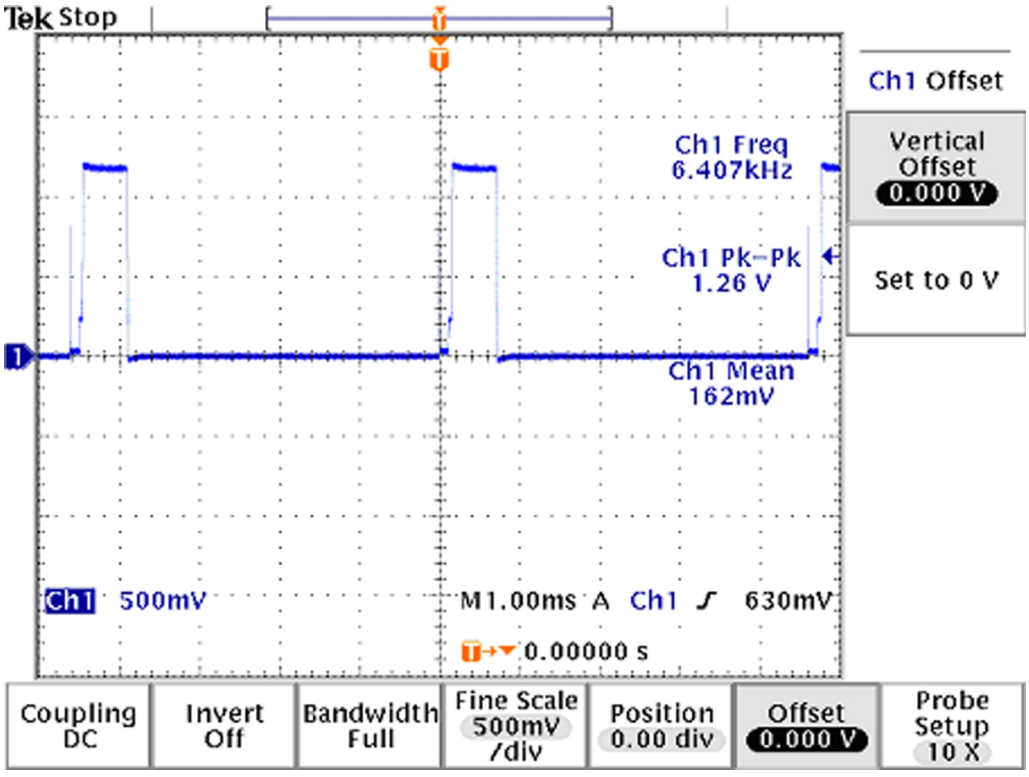

Figure 149 TXC signals at PCL0

GSM1800 TX output power

Measure the output power of the phone; it should be about 29.5 dBm. Remember the cable loss is about 0.5 dB.

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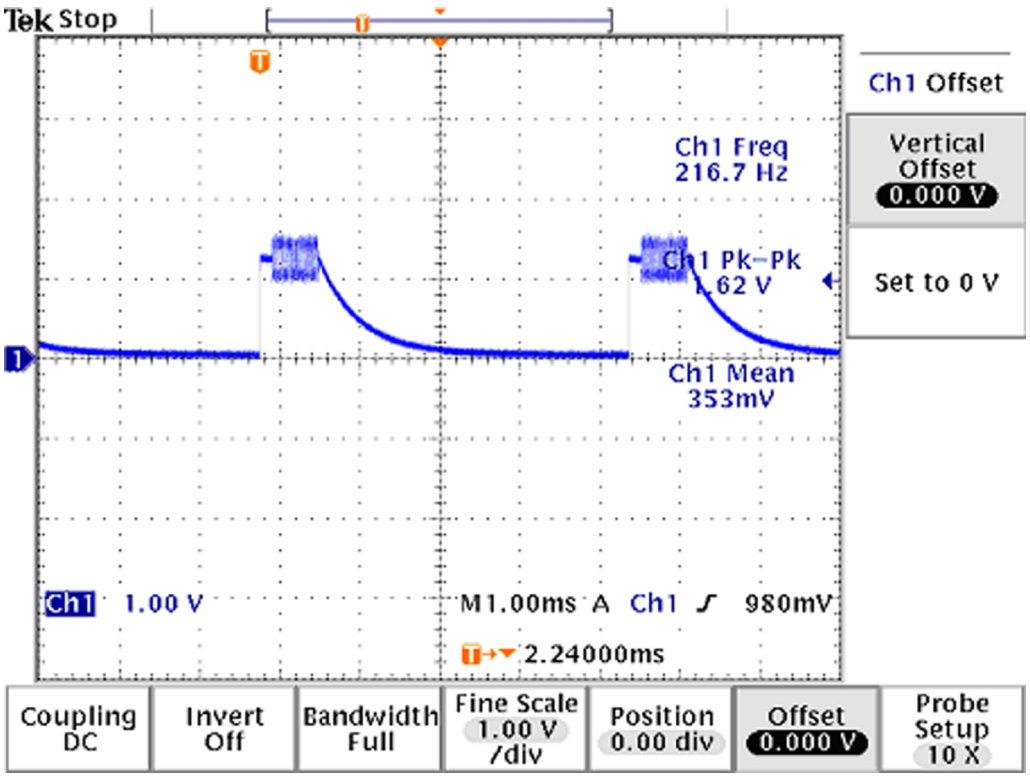

Figure 150 TX I/O signal

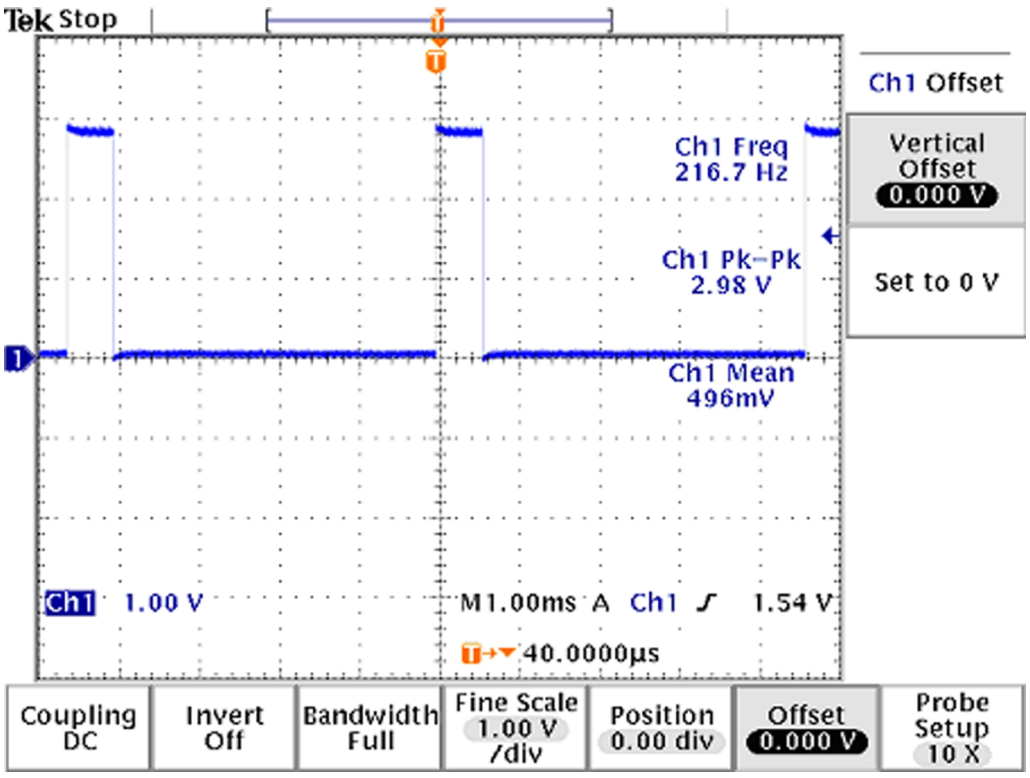

Figure 151 VC1, VC2, VC3 signals

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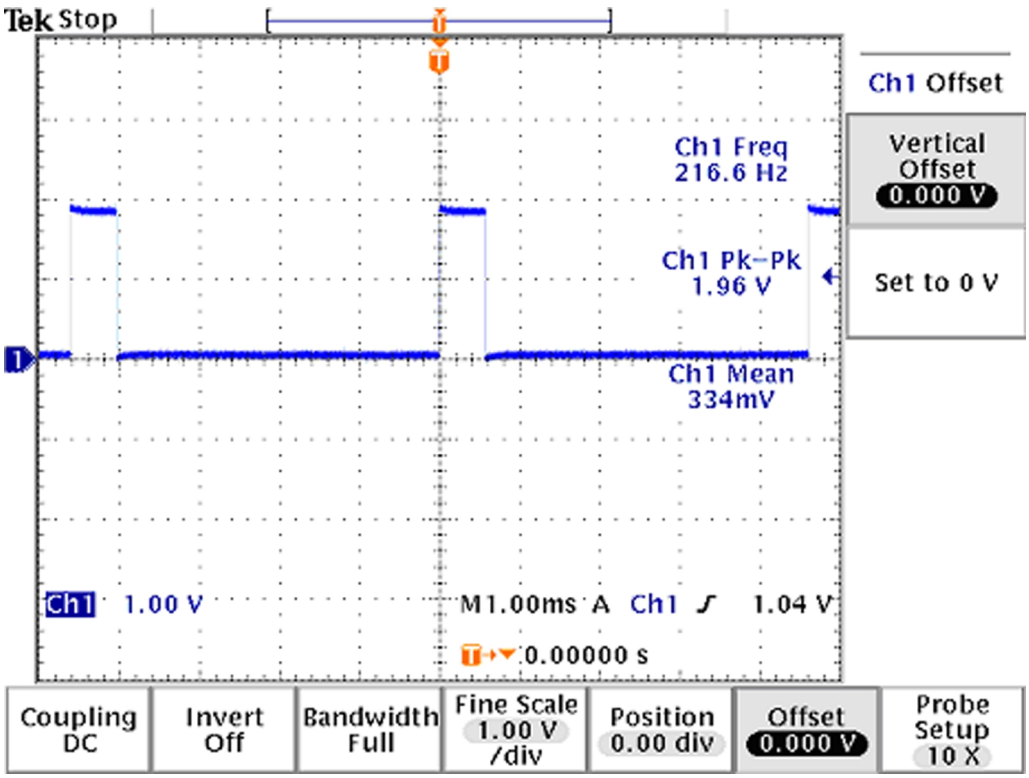

Figure 152 TXP signal

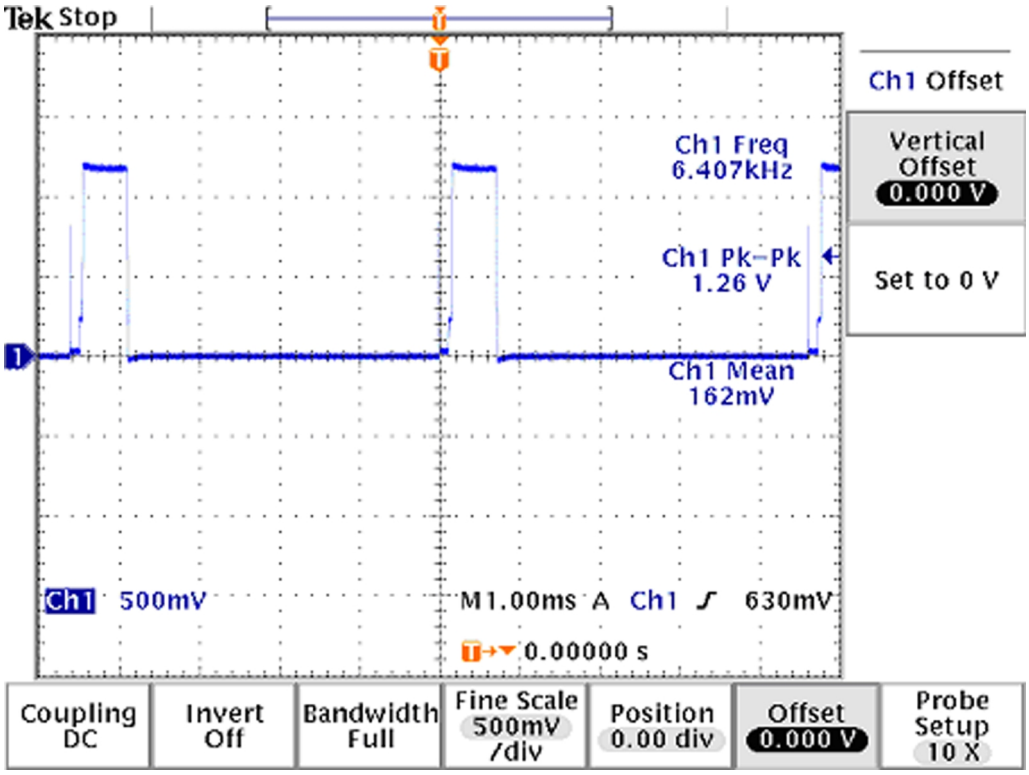

Figure 153 TXC signals at PCL0

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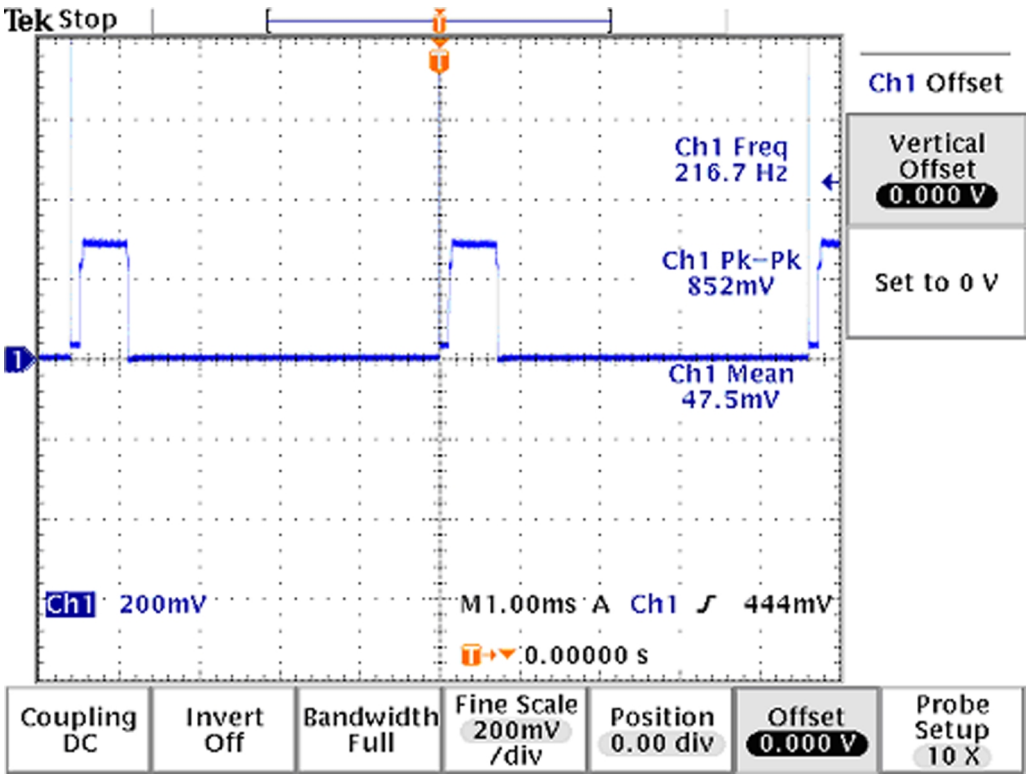

Figure 154 TXC signals at PCL15

Synthesizer troubleshooting

Introduction

26 MHz Reference Oscillator (VCXO)

There is only one PLL synthesizer generating Local Oscillator frequencies for both RX and TX in both bands (PCN and EGSM). The VCO frequency is divided by 2 for PCN operation or by 4 for EGSM operation inside the RF IC.

The 26MHz oscillator is located near the RF IC (N7600). The coarse frequency for this oscillator is set by an external crystal (B7600). The reference oscillator is used as a reference frequency for the PLL synthesizer and as the system clock for the Baseband. The 26MHz signal is divided by 2 to achieve 13MHz inside the UPP IC (D2800).

The 26MHz signal from the VCXO can be measured by probing R2900. The level at this point is approx. 770mVpp. Frequency of this oscillator is adjusted by changing the AFC-register inside the UEM IC. Example Signal Measured at VCXO output (R2900).

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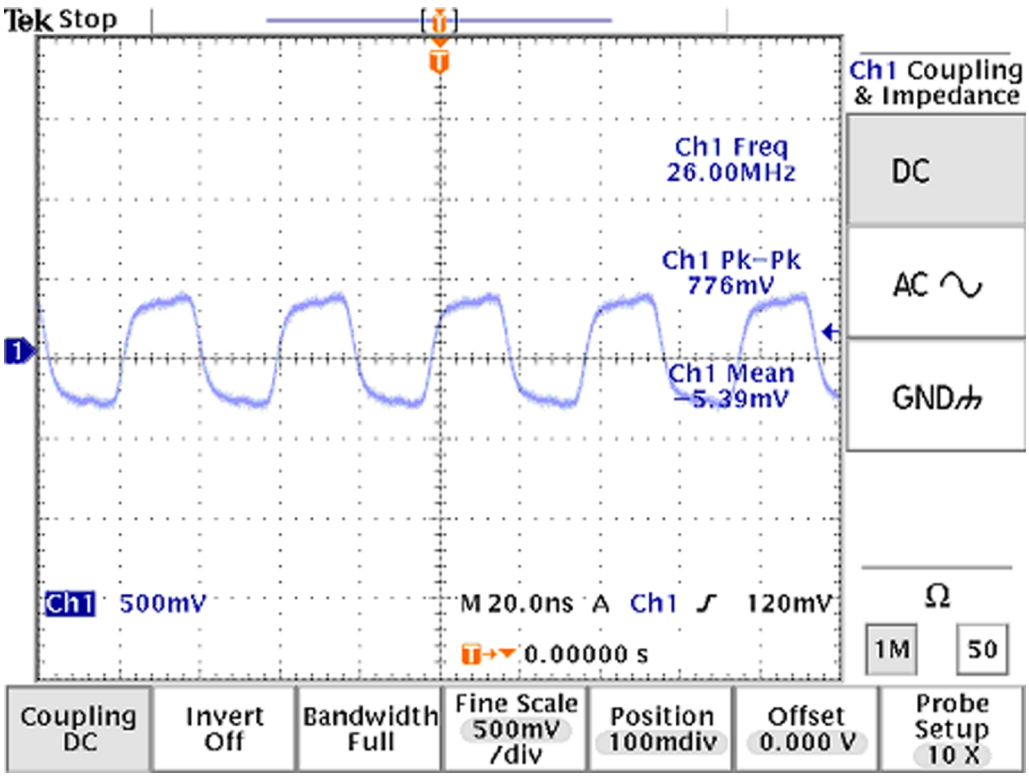

Figure 155 VCXO 26 MHz waveform

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Antenna troubleshooting

Antenna troubleshooting

Troubleshooting flow

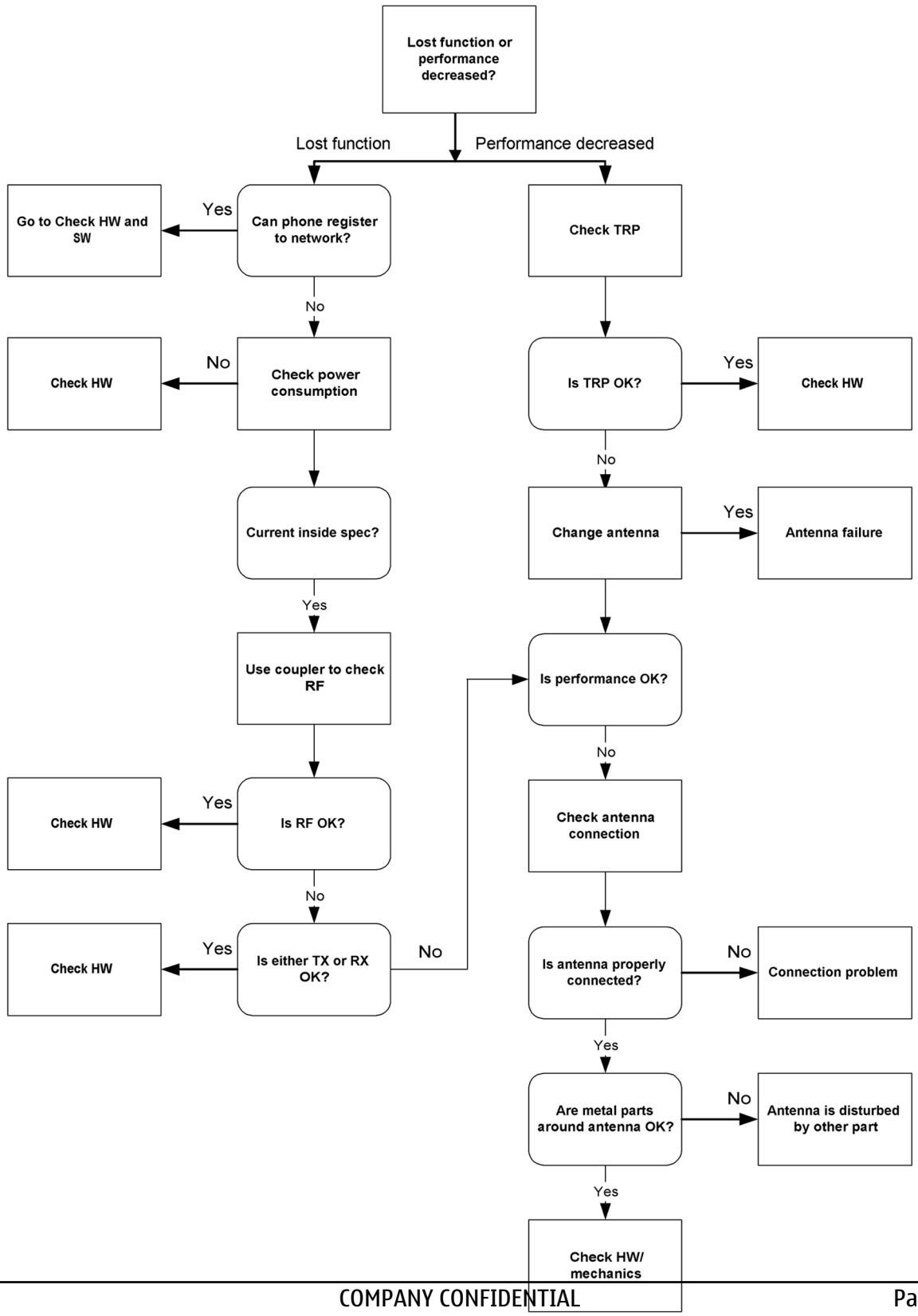

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Figure 156 Antenna troubleshooting

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8 — System module

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Block diagram

System module block diagram

The main board consists of a radio frequency part and a baseband part. The User Interface parts are situated at the UI side, which is on the opposite side of the engine board. The 1MF is the system module of the mobile device.

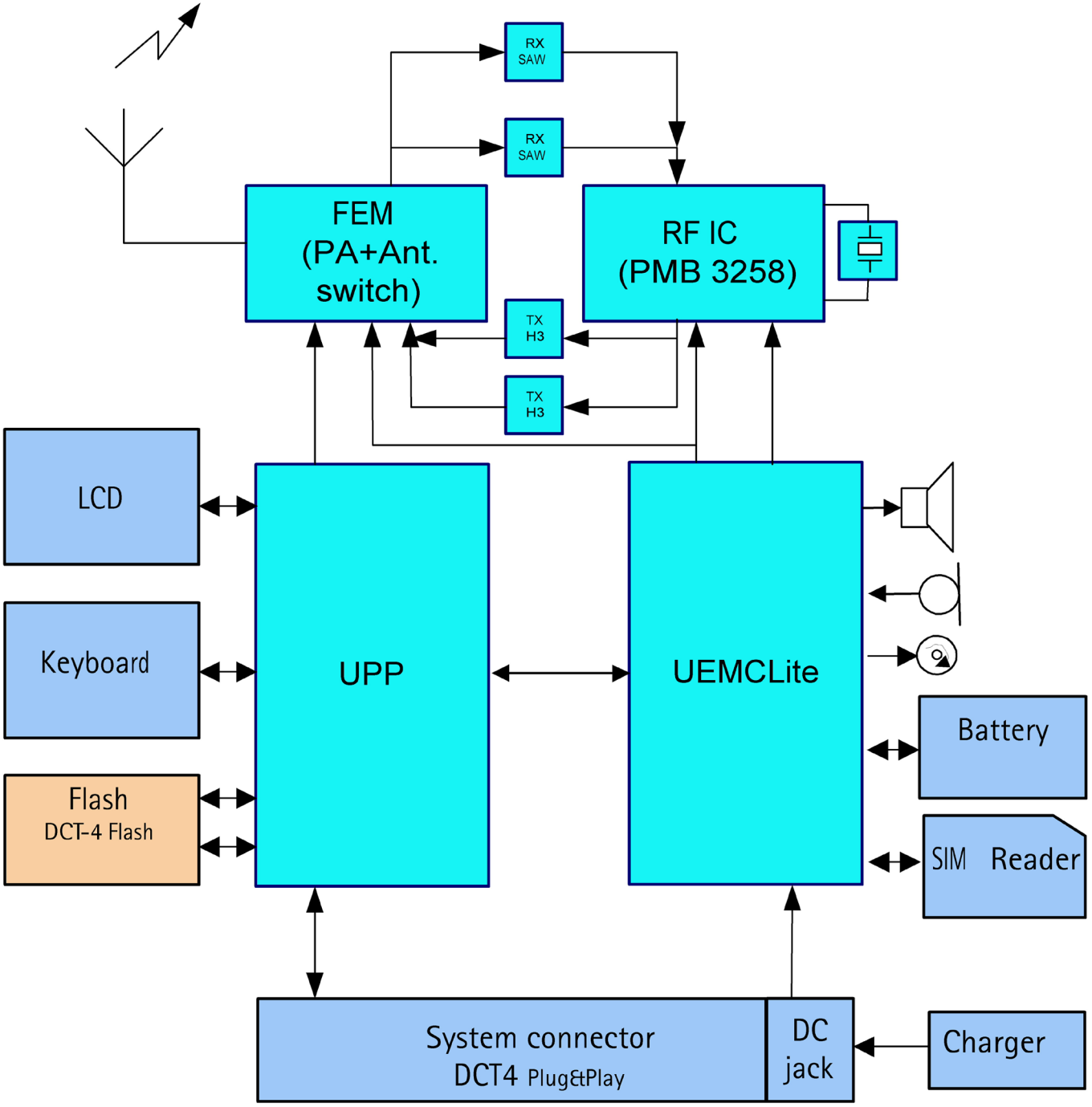

Figure 157 Module block diagram

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Functional description

The BB core is based on UPP4M CPU. UPP4M takes care of all the signal processing and operation controlling tasks of the mobile device. For power management, there is one main ASIC for controlling, charging and supplying power UEMCLite plus a discrete power supply. The UEMCLite generates the main reset for the system. Memories comprise 128 Mbit flash and 16 Mbit PsRAM. Memory devices are stacked on top of each other in a single Combo package.

The UEMCLite also handles the interface to the RF and audio sections. This ASIC provides A/D and D/A conversion of the in-phase and quadrate receive and transmit signal paths and also A/D and D/A conversions of received and transmitted audio signals. Data transmission between UEMCLite and RF and the UPP4M is implemented using different serial connections (CBUS, DBUS and RFBUS). UPP4M ASIC handles digital speech processing.

A real time clock function is integrated into UEMCLite, which utilizes the same 32 kHz-clock source as the sleep clock. The SLCK/RTC runs all time when the phone battery is connected. It is running also when the phone is switched off.

There are two audio transducers in the product; 13 mm speaker and a microphone. The speaker is used to generate audios for earpiece, IHF and ringing tones. A separate audio amplifier drives the speaker. There is only one microphone for both HS and IHF modes.

The display is a CSTN type color display with 65536 colors and 128 x 128 pixels with backlighting. The UI module features a function key mat with a 4-way navigation key with a center selection key.

Baseband description

UPP

UPP (Universal Phone Processor) is the digital ASIC of the DCT4 generation base band. UPP4Mv3 includes 4.5 MBit internal RAM, 16/32-bit RISC MCU core.

Memory

This mobile uses two kinds of memories, Flash and Synchronous RAM (SRAM). These memories have are sharing the same bus interface to UPP4M. SDRAM is used as the working memory. The SRAM size is 16 Mbits.

SRAM I/O is 1.8 V and core 1.8 V supplied by UEMCLite regulator VIO. All memory contents are lost if the supply voltage is switched off.

Multiplexed flash memory interface is used to store the MCU program code and user data.

Configuration of flash memory is a 128 Mbit NOR flash memory. Flash I/O and core voltage are 1.8 V.

UEMCLite

The UEMCLite is a low cost energy management ASIC contains for BB use two 2.78V LDO regulators, 1.8V linear regulator, programmable 1.0 - 1.5 V linear regulator and 1.8/3.0 V LDO regulator. For RF use UEMCLite has five 2.78 V LDOs. In addition, the UEMCLite contains audio codec, A/D converters, RF converters, many drivers, etc.

Below is a list of the supply voltages.

Table 10 RF power supply

	Vmin/V	Vtyp/V	Vmax/V	ItypmA	Imax mA	Notes
VR1	2.7	2.78	2.86	65	75	VTX (Supply voltage for PMB3258 LO and RX parts
VR2	2.7	2.78	2.78	2.4	3.0	VXO (VCXO supply voltage)

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	Vmin/V	Vtyp/V	Vmax/V	ItypmA	Imax mA	Notes
VR3	2.7	2.78	2.86	41	47	VTX2 (Supply voltage for PMB3258 modulator output stage)
VR4	2.7	2.78	2.86	43	48	VRX (Supply for RFIC RX and TX parts)
VR5	2.7	2.78	2.86	29	35	VPLL (Supply for VCO, PLL and digital parts
VBATTRF	3.1	3.6	4.7	1.5	3.5	Supply voltage for the front-end module (Vbatt, max=6.0 V)

The table below shows the typical current consumption in different operation modes.

Table 11 Baseband power supply

Signal, Nom Volt., Max Current	Min-Max Voltage (V)	Iqmax	PSSR(dB)*	Notes
VANA, 2,78V, 80mA	2.7-2.86	200	50, 40	Disabled in sleep mode
VBB1 2,78V, sleep 2mA, norm. 50mA	2.7-2.86	15 sleep, 200	40, -	Sleep mode possibility
VSIM, 1.8/3.0, 25mA	1.745- 1.8552.910-3.090	30 sleep, 80	40, -	Sleep mode possibility, programmable
VIO, 1.8V	1.72 - 1.88	15 sleep, 100	45, -	Sleep mode possibility
VCORE, 1.055/1.25/1.35/1.5V	1.0 - 1.111.188 - 1.3131.285 -1.4151.425 -1.575	20 sleep, 200	40, -	Sleep, programmable, Initial voltage 1.35V from reset

External regulators

White LED Driver solution is implemented with DC/DC converter. The driver circuit is controlled by UEM output pin DLIGHT, which add external pull up using a digital transistor and one resistor. The schematics also combined the UEMIO (5) to control DC/DC enable as another optional using two jumper.

Energy management

Filter components

The master of EM control is UEMCLite and with SW it has the main control of the system voltages and operating modes. The power distribution diagram is presented in the illustration below.

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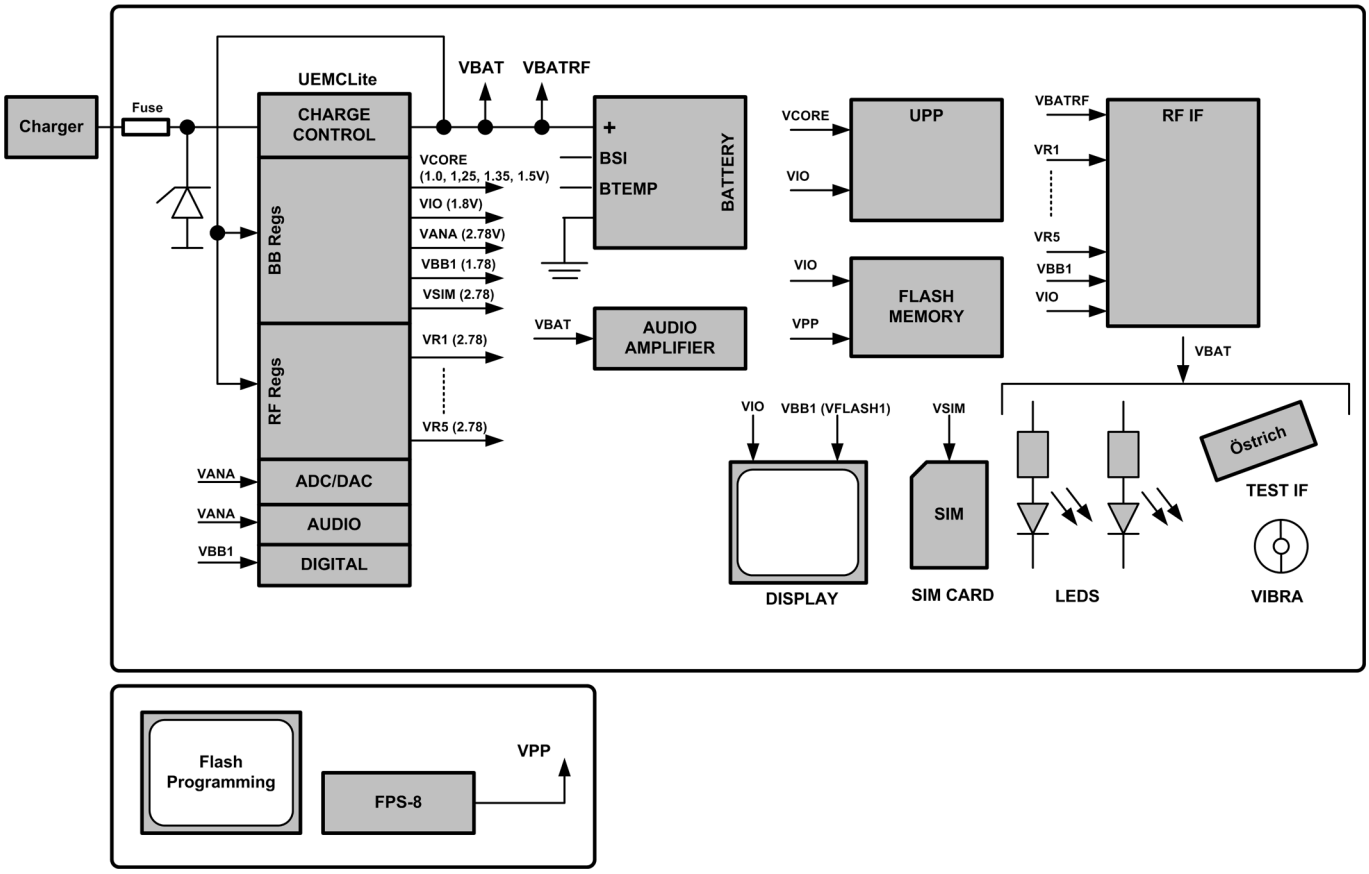

Figure 158 Power connection diagram

All connectors going to the "outside world" have filter components, ESD protection and EMC reduction. The Digital/Data lines on SIM have special dedicated filter ASIP. The below figure show the SIM filtering.

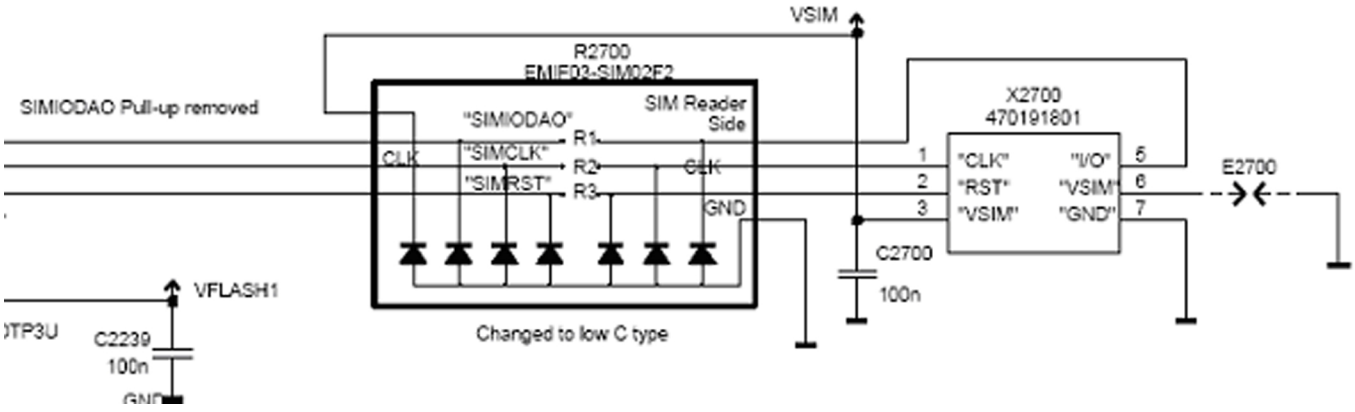

Figure 159 SIM filtering

The Audio circuit: Earpiece, IHF, internal microphone and external speaker are filtered with discrete components (common mode reduction coils, Varistors, caps and resistors), where as the external microphone uses differential mode mic. ASIP

The 16 UEMECLite BB & RF regulators are specified to have a decoupling cap of 1 µF ±20%.

Modes of operation

BB4.0 LiteV2 base band has five different functional modes, which are defined in UEMCLite specification:

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- No supply: In NO_SUPPLY mode, the phone has no supply voltage. This mode is due to disconnection of main battery or low battery voltage level in battery. Phone is exiting from NO_SUPPLY mode when sufficient battery voltage level is detected. Battery voltage can rise either by connecting a new battery with VBAT > VMSTR+ or by connecting charger and charging the battery above VMSTR+.
- Acting Dead: If the phone is off when the charger is connected, the phone is powered on but enters a state called "Acting Dead". To the user, the phone acts as if it was switched off. A battery charging alert is given and/or a battery charging indication on the display is shown to acknowledge the user that the battery is being charged.
- Active: In the Active mode the phone is in normal operation, scanning for channels, listening to a base station, transmitting and processing information. There are several sub-states in the active mode.
- Sleep: In sleep mode VCTCXO is shut down and 32 kHz sleep clock oscillator is used as reference clock for the base band.
- Charging: Charging can be performed in any operating mode. The battery type / size is indicated by a resistor inside the battery pack. The resistor value corresponds to a specific battery capacity. The battery voltage rise is limited by turning the UEMCLite switch off when the battery voltage has reached 4.2 V. Charging current is monitored by measuring the voltage drop across a 220 mW resistor.

Voltage limits

Table 12 Voltage limits

Parameter	Description	Value/V
Vmstr+	Master reset threshold (rising)	2.1 ±0.1
Vmstr-	Master reset threshold (falling)	1.9 ±0.1
Vcoff+	Hardware cutoff (rising)	3.1 ±0.1
Vcoff-	Hardware cutoff (falling)	2.8 ±0.1
SW shutdown	SW cutoff limit (> regulator drop-out limit) MIN!	3.2 V

Audio function description

Audio

The basic audio structure and communication between HW-audio modules and the audio ASIC's is illustrated in the block diagram below.

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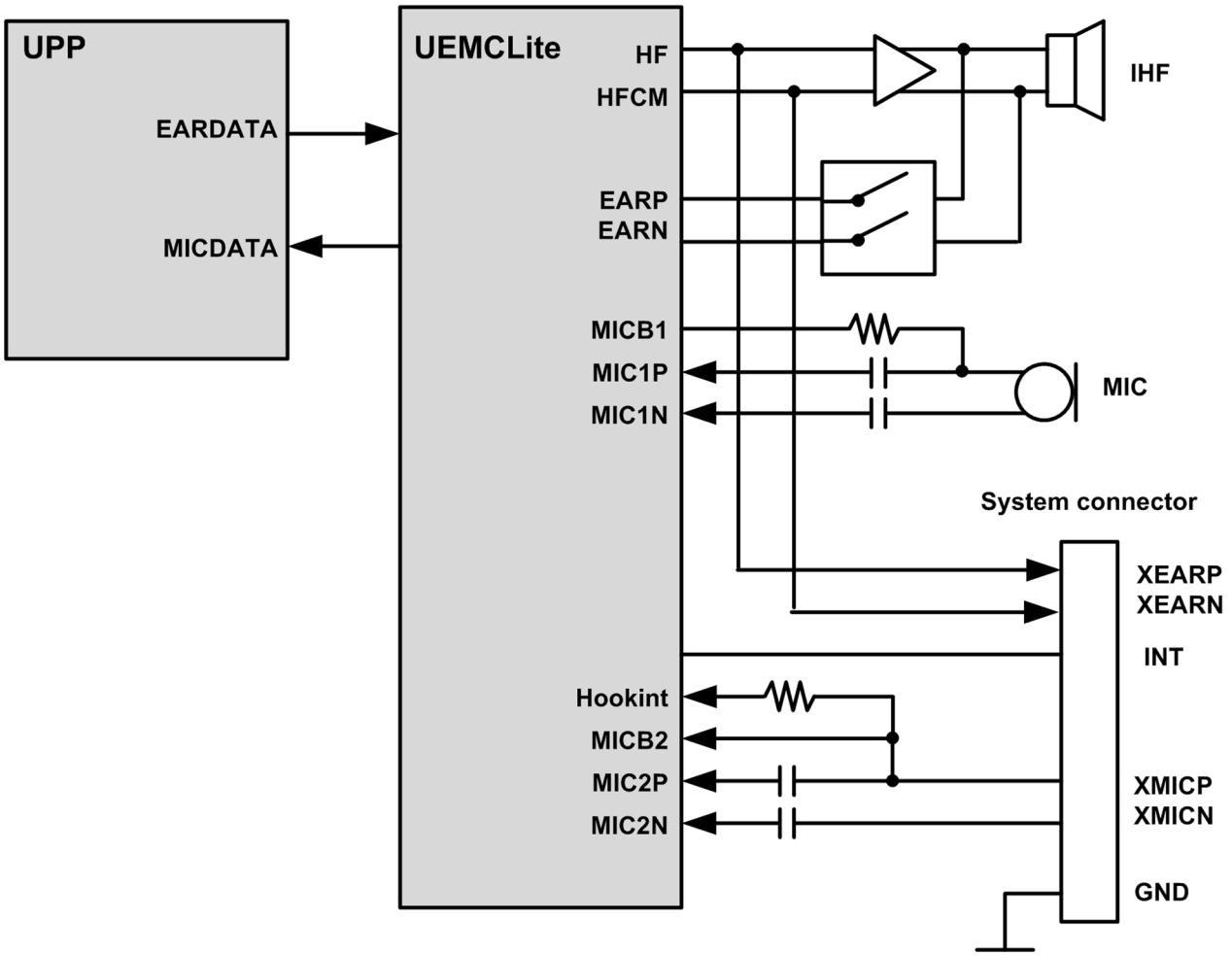

Figure 160 Audio block diagram

UEMCLite supports three microphone inputs and two earphone outputs. The microphone signals from different sources are connected to separate inputs at the UEMCLite ASIC. The inputs and outputs are all differential.

Three inputs (MIC1, MIC2, MIC3) and two outputs (EAR, HF/HFCM) are used. MIC1P/MIC1N input is used for the internal microphone, using single-ended biasing circuitry. EARP/EARN output from UEMCLite is used for hand-portable mode.

Uplink external audio (headset as well as car kit) is connected to MIC2P/MIC2N, while downlink audio is provided via the HF/HFCM output from UEMCLite. The car kit only can be used with external microphone connected.

The audio control is taken care of by UEMCLite, which contains the MCU and audio codec. Input and output selection, and gain control is performed inside UEMCLite. DTMF-tones and other audio tones are generated and encoded by UPP and transmitted to UEMCLite for decoding.

An external amplifier (D-class) is connected to provide sufficient power for an 8 W load. The inputs are wired to the headset connections HF and HFCM from UEMCLite.

EARP/N output is used for hand-portable speech, connected with PA output through switches.

Under normal conditions HF and HFCM is used for downlink audio to the headset/car kit. During headset/car kit usage the audio amplifier is disabled by means of the shutdown pin. Keeping the shutdown pin "low" also during sleep, secures a minimum amount of standby current to be consumed.

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SMD vibra has a diameter is about 4.0-mm. Vibra is driven by PWM signal, generating vibration by rotating an un-balanced mass (counter weight) with radius of R=2.3-mm. The vibration signal is used as a silent alert call and also as a noticeable shock in gaming.

External audio connector

The system connector, containing a 4-pole Jack plug, gains the access to the external audio interface. The Jack plug, which is integrated in the system connector, contains a mechanical switch, which is used to detect the connection of the accessories. The configuration for the 4-pole Jack-plug is shown in the following figure.

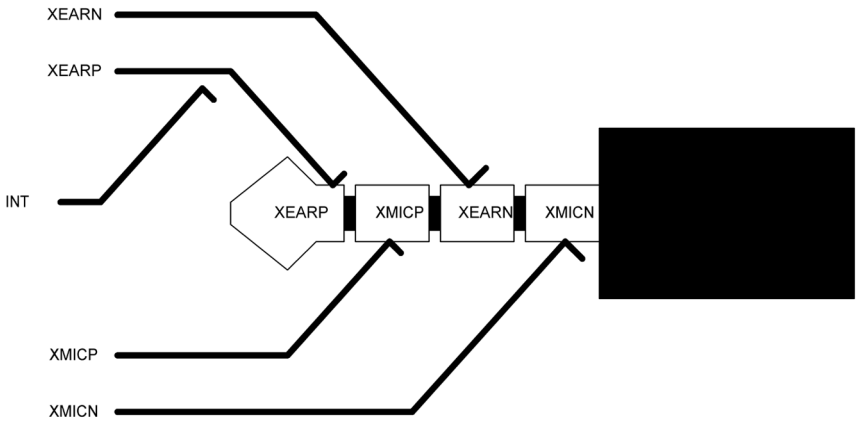

Figure 161 4-pole jack plug for audio accessory

Table 13 Connector for External Audio Accessories

Line symbol	Function
XMICP	External microphone signal input
XMICN	External microphone signal input
XEARP	External earphone signal output
XEARN	External earphone signal output
INT	Accessory detection
GND	Ground (Only used by PPH-1)

External signals and connections

Table 14 System connector

Signal	From	To	Min	Nom	Max	Condi-tion	Note
XMICP	HS/HF Mic	UEMC Lite		2/60m V diff		Analog audio in	Headset Mic bias and audio signal 2mV nominal. HF Mic signal 60mV nominal. Differential symmetric input.
						DC bias 2V2kohm	Accessory detection by bias loading
XMICN				2/60m V diff		Ana in / 1k to GND	Hook interrupt by heavy bias loading

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Signal	From	To	Min	Nom	Max	Condi-tion	Note
XEARP	HS/HF	UEMC Lite		100 mV diff		Ana in	Quasi-differential DC-coupled earpiece/HF amplifier signal to accessory. DC biased to 0.8V
XEARN	EAR/ Amp.						
INT HEADINT	Switch	UEMC Lite		0/2.7V		Dig in	HS interrupt from bottom connector switch when plug inserted.
VCHARIN	Charger	UEMC Lite		11.1Vp eak	16.9 Vpeak	Standard	Vch from Charger Connector, max 20V
					7.9 VRMS		
					1.0 Apeak		
			7.0 VRMS	8.4 VRMS	9.2 VRMS	Fast charger	
					850 mA		
GND					GND		GND from/to Charger connector

Interfaces

RF and baseband interfaces

Table 15 AC and DC Characteristics of BB4.0 LiteV2 RF-Base band Digital Signals

Signal name	From	To	Para-meter	Input characteristics				Function
				Min	Typ	Max	Unit	
TXP1	UPP	RF-IC	1	1.38		1.88	V	Depends of the RF design
RFGenOut3	GenIO5		0	0		0.4	V	
			Load Resistance	10			kW	
			Load Capacitance			20	pF	
			Timing Accuracy			¼	symbol	

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Signal name	From	To	Para-meter	Input characteristics				Function
				Min	Typ	Max	Unit	
TXP2	UPP	RF-IC	1	1.38		1.88	V	Depends of the RF design
	(GenIO6)		0	0		0.4	V	
			Load Resistance	10			kW	
			Load Capacitance			20	pF	
			Timing Accuracy			¼	symbol	
RFBusEn1X	UPP	RF-IC	1	1.38		1.88	V	RFIC Chip SelX
			0	0		0.4	V	
			Internal PU Current			50	uA	
			Load resistance	10			kW	
			Load capacitance			20	pF	
RFBusDa	UPP / RF-IC	RF-IC/ UPP	1	1.38		1.88	V	Bi-directional RF Control serial bus data,
			0	0		0.4	V	
			Load resistance	10			kW	
			Load capacitance			20	pF	
			Data frequency			13	MHz	
RFBusClk	UPP	RF IC	1	1.38		1.88	V	RF Control serial bus bit clock
			0	0		0.4	V	
			Load resistance	10			kW	
			Load capacitance			20	pF	
			Data frequency			13	MHz	

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Signal name	From	To	Para-meter	Input characteristics				Function
				Min	Typ	Max	Unit	
GENIO3	UEMCLite	RF IC	1		2.78		V	RF Control *
			0				V	Depends of the RF design
			Load resistance				kW	
			Output current			4	mA	
GENIO4	UEMCLite	RF IC	1		2.78		V	Audio clock input in UEMCLiteV3 and LittiV2
			0				V	
			Load resistance				kW	
			Output current			4	mA	
GENIO5	UEMCLite	RF IC	1		2.78		V	RF Control *
			0				V	Depends of the RF design
			Load resistance				kW	
			Output current			4	mA	

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Analogue Signals

Table 16 AC and DC Characteristics of RF-Base band Analogue Signals

Signal name	From	To	Parameter	Min	Typ	Max	Unit	Function
RFCLK	VCTCXO	UPP	Frequency		13/26		MHz	System Clk from RF to BB,
			Signal amplitude	0.2	0.8	1.32	Vpp	13/26 MHz Depending on RF chipset
			Input Impedance	10			kW	UPP minimum recommended amplitude is 0.3Vpp.
			Input Capacitance			10	pF	
			Harmonic Content			-8	dBc	
			Clear signal window (no glitch)	200			mVpp	
			Duty Cycle	40		60	%	
RFCLKGnd	VCTCXO	UPP	DC Level		0		V	System Clock slicer Ref GND, not separated from pwb GND layer
RXIP, RXIN, RXQP, RXQN	RF-IC	UEMCLite	Voltage swing (static)		1.4	1.45	Vpp	Differential positive / negative in-phase and quadrature Rx Signals.
			DC level	1.3	1.35	1.4	V	
			I/Q amplitude mismatch			0.2	dB	
			I/Q phase mismatch	-0.5		0.5	deg	
TXIP, TXIN, TXQP, TXQN	UEMCLite	RF-IC	Differential voltage swing (static)	2.25		2.45	Vpp	Differential positive / negative in-phase and quadrature Tx Signals
								In High-Z when RX is receiving.
			DC level	1.17	1.20	1.23	V	
			Source Impedance			200	W	

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Signal name	From	To	Parameter	Min	Typ	Max	Unit	Function
AFC	UEMCLite (AFCOUT)	VCTCXO	Voltage Min	0.0		0.1	V	Automatic Frequency Control signal for VCTCXO Programmable
			Max	2.4		2.55		
			Resolution	11			bits	
			Load resistance	1			kW	
			and capacitance			100	nF	
			Source Impedance			200	W	
			Output impedance	10			MW	Path powered down
TxC	UEMCLite (AUXOUT)	RF-IC	Voltage Min			0.1	V	Transmitter power level and ramping control, Ref UEMCLite RF converter specification
			Max	2.4				
			Source Impedance			200	W	
			Resolution	10			bits	
VCXOTEMP	RF-IC	UEMCLite	Input voltage range	0		2.7	V	
			Input resistance	900		6000	Ohm	
			Resolution	10			bits	
PATEMP	RF-IC	UEMCLite	Voltage at -20oC		1.57		V	Usage depends of the RF design

LCD interface

LCD panel includes upper and lower polarizers, LCD transflective glass, single chip COG driver with 132x132x116bit RAM, 10-pin board-to-board connector and FPC with discrete components.

Keyboard

A 5 X 5 matrix keyboad consists of 21keys, one 10-channel integrated passive filiter arrays with downstream ESD protection of >8KV connect the matrix keyboard to UPP.

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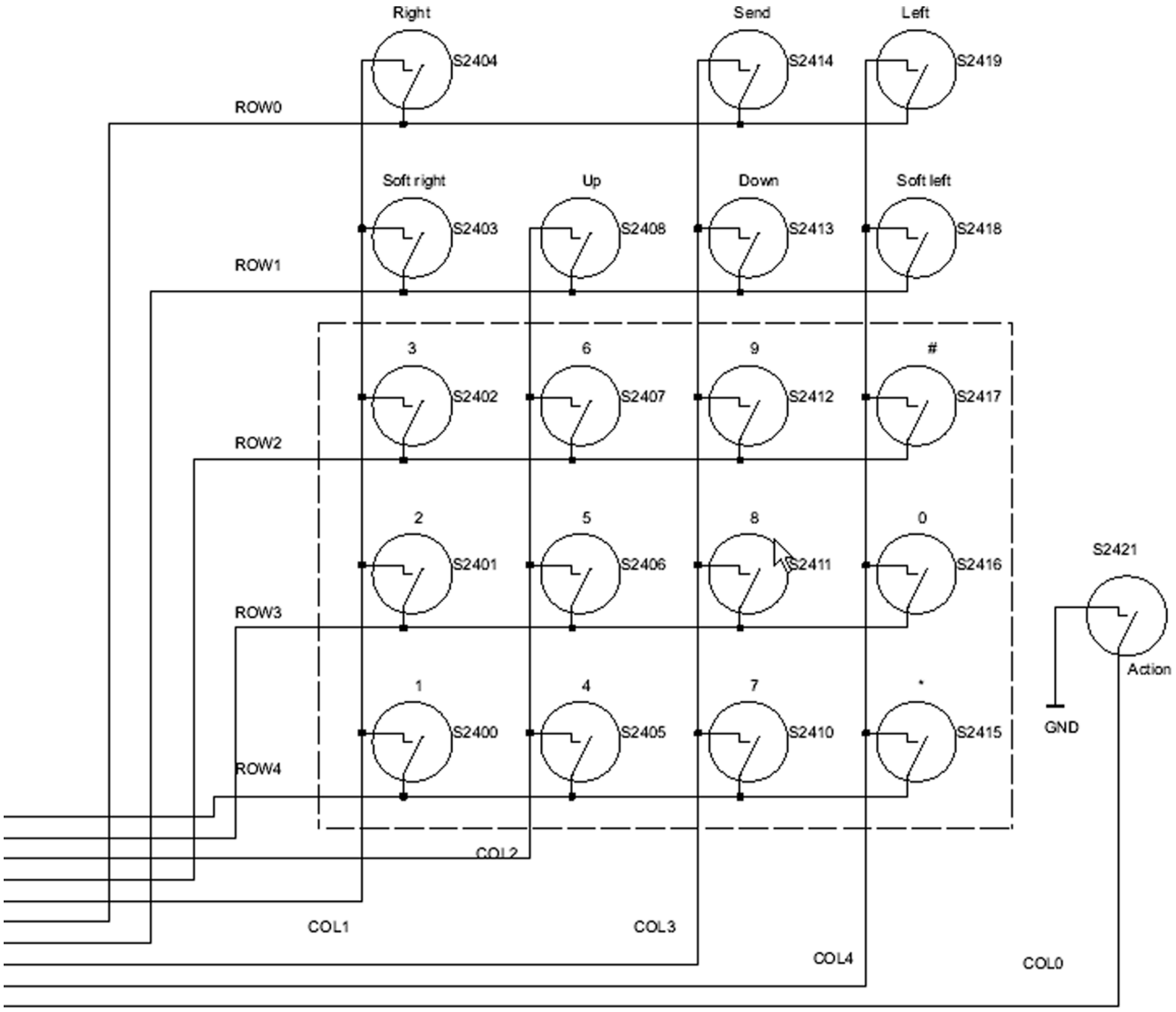

Figure 162 Keyboard schematics

The layout is shown in Keyboard layout in UI side.

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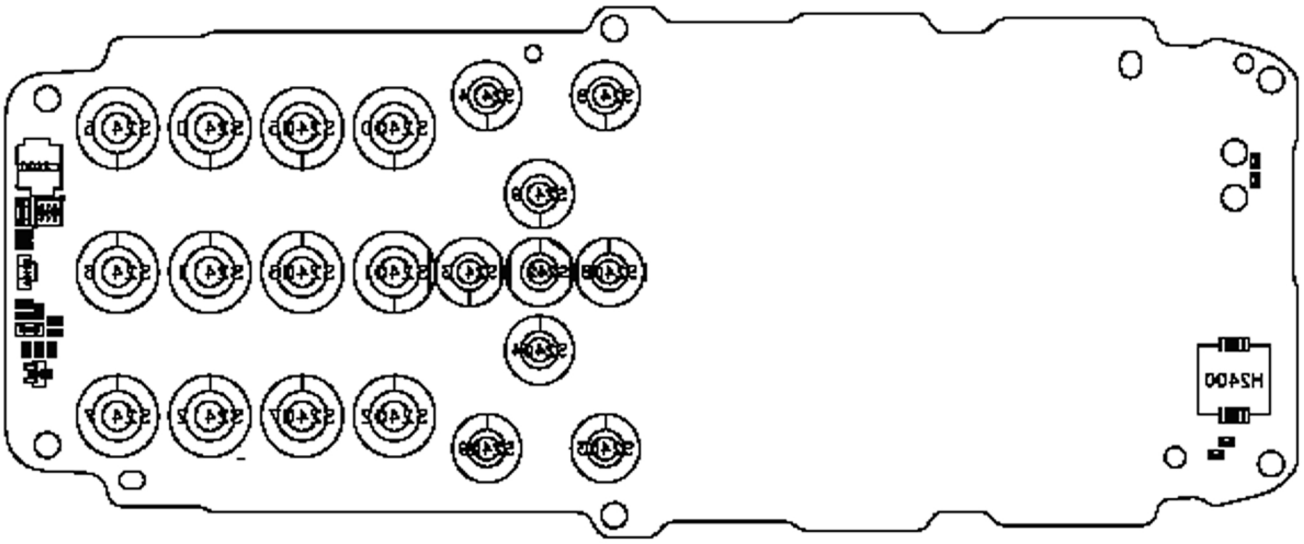

Figure 163 Keyboard layout in UI side

SIM interface

The SIM interface is programmed to support 3V and 1.8V SIMs.

The SIM interface is the electrical interface between the Subscriber Identity Module Card (SIM Card) and mobile phone.

Table 17 SIM interface

Pin	Name	Parameter	Min	Typ	Max	Unit	Notes
1	VSIM	1.8V SIM Card	1.6	1.8	1.9	V	Supply voltage
		3V SIM Card	2.8	3.0	3.2	V	
2	SIMRST	1.8V SIM Card	0.9xVSIM		VSIM	V	SIM reset (output)
			0		0.15xVSIM		
		3V SIM Card	0.9xVSIM		VSIM	V	
			0		0.15xVSIM		
3	SIMCLK	Frequency		3.25		MHz	
		Trise/Tfall			50	ns	
		1.8V Voh	0.9xVSIM		VSIM	V	
		1.8V Vol	0				
		3V Voh	0.9xVSIM		VSIM	V	
		3V Vol	0				

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Pin	Name	Parameter	Min	Typ	Max	Unit	Notes
4	DATA	1.8V Voh	0.9xVSIM		VSIM	V	SIM data (output)
		1.8V Vol	0		0.15xVSIM		
		3V Voh	0.9xVSIM		VSIM		
		3V Vol	0		0.15xVSIM		
		1.8V Vih	0.7xVSIM		VSIM	V	SIM data (input)
		1.8V Vil	0		0.15xVSIM		Trise/Tfall max 1us
		3V Vil	0.7xVSIM		VSIM		
		3V Vil	0		0.15xVSIM		
5	NC						Not connected
6	GND	GND	0		0	V	Ground
VSIM specified in regulator section in this document							

External signals and connections

Table 18 System connector

Signal	From	To	Min	Nom	Max	Condi-tion	Note
XMICP	HS/HF Mic	UEMC Lite		2/60mV diff		Analog audio in	Headset Mic bias and audio signal 2mV nominal. HF Mic signal 60mV nominal. Differential symmetric input.
						DC bias 2V2kohm	Accessory detection by bias loading
XMICN				2/60mV diff		Ana in / 1k to GND	Hook interrupt by heavy bias loading
XEARP	HS/HF	UEMC Lite		100 mV diff		Ana in	Quasi-differential DC-coupled earpiece/HF amplifier signal to accessory. DC biased to 0.8V
XEARN	EAR/ Amp.						
INT HEADINT	Switch	UEMC Lite		0/2.7V		Dig in	HS interrupt from bottom connector switch when plug inserted.

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Signal	From	To	Min	Nom	Max	Condi-tion	Note
VCHARIN	Charger	UEMC Lite		11.1Vp eak	16.9 Vpeak	Standard	Vch from Charger Connector, max 20V
					7.9 VRMS		
					1.0 Apeak		
			7.0 VRMS	8.4 VRMS	9.2 VRMS	Fast charger	
					850 mA		
GND					GND		GND from/to Charger connector

Battery connector

Internal, user-changeable batteries. Semi-fixed. Types: Li-Ion, NiMH. Interface, 4 terminals (VBATT, GND, BSI, BTEMP) Janette battery interface is used. The battery type and size are defined in the next chapter.

Table 19 Battery IF

Signal	From	To	Min	Nom	Max	Condi-tion	Note
GND	Global	Batt (-)					Global GND
VBAT		Batt (+)	3.1		5.1		Battery Voltage
BSI		UEMCLite	0		2.78		Analog input, Battery Size Indicator Resistor, 100 kohm pull up to 2.78V (VBB1).
BTEMP		UEMCLite	0		2.78		Btemp NTC Resistor, 100 kohm pull up to 2.78V (VANA)

* Note! In BL-5C battery IF the BTEMP signal doesn't exists. Temperature measurement is done on system board with NTC resistor.

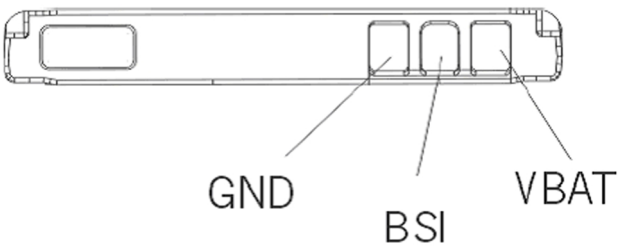

Figure 164 BL-5C battery connection order

Battery BL-5C

- Type: BL-5C
- Technology: Li-Ion, 4.2 V charging, 3.1 V cut-off

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- Capacity: 900 mAh.

The BSI resistor is placed on the main PWB as the telephone supports only one battery capacity. Further a BSI connection is added to the Flash interface. The battery temperature is measured by a NTC resistor placed on the main PWB, opposite to the Battery. Battery pack has an impedance of 130 - 150 mΩ (0 – 45 °C).

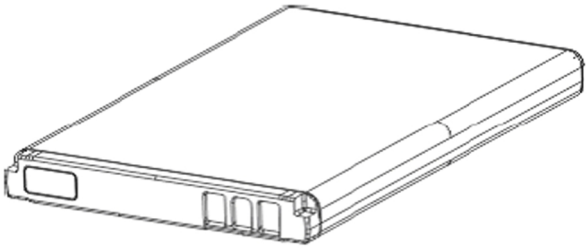
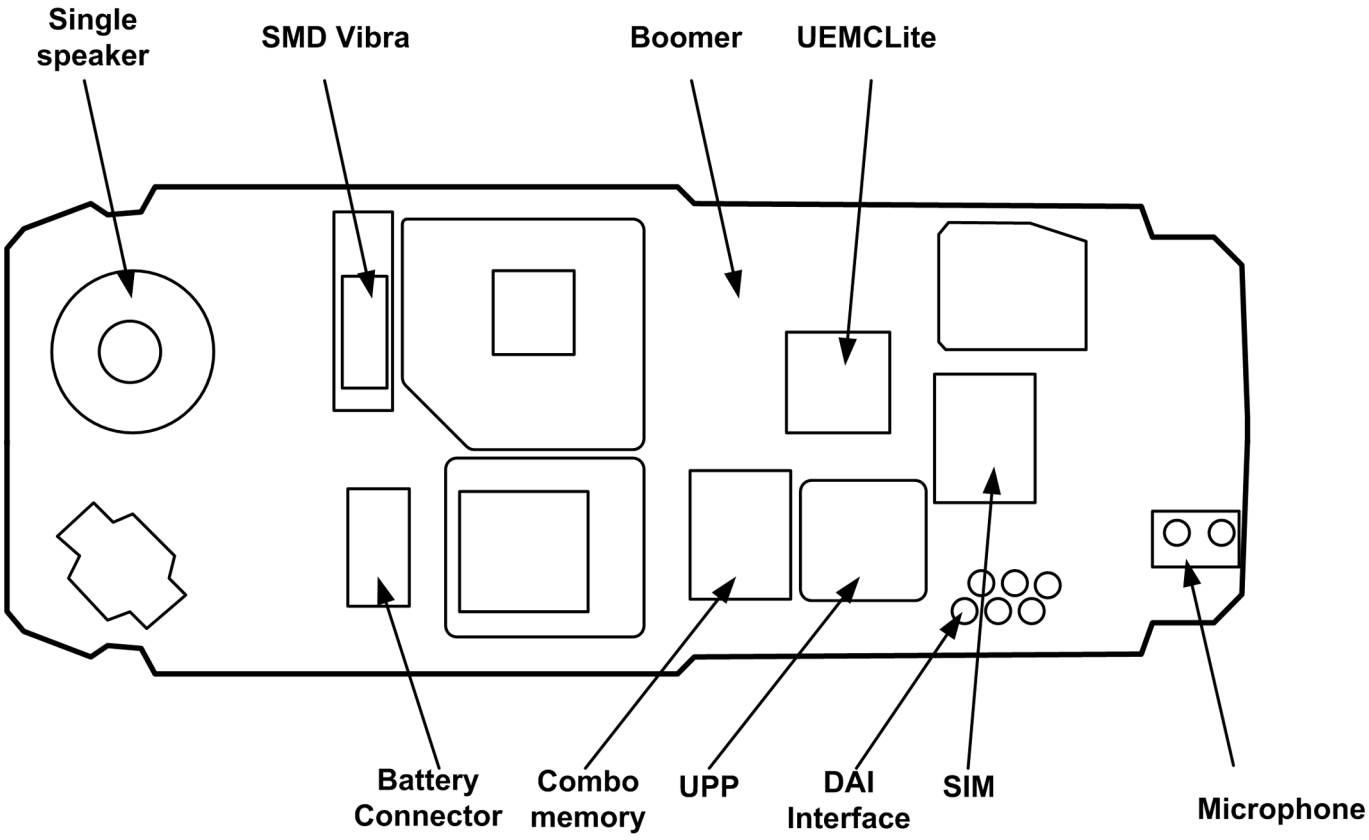


Figure 165 BL-5C battery block

PWB outline (baseband)



RF description

Frequency band, power and multi-slot class

The requirements leads to the specification in the table below:

Table 20 Frequency bands and TX power class

System	Frequency band	TX power class
GSM900	Tx: 880 – 915 MHz	4 (33dBm)

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System	Frequency band	TX power class
	Rx: 925 – 960 MHz	
GSM1800	Tx: 1710 – 1785 MHz	1 (30dBm)
	Rx: 1805 – 1880 MHz	

Table 21 Multi-slot class

Multislot Class	
GPRS	MSC 6 (up to 3+1 and 2+2)

Transmitter - general description

The transmitter has separate, parallel paths covering the different bands. The transmitter operates in GMSK mode only. The power level control circuitry is integrated in the front-end module.

Each path of the transmitter is composed of a baseband lowpass filter for the I/Q signals and a quadrature direct modulator integrated in PMB3258. At the modulator's output there is a bandpass filter for each band (so-called H3 filter) and a balun transformer to convert the differential output signal from the modulator into a single-ended 50 ohm signal. This signal is fed into the input of the PA. The two power amplifiers and the antenna switch are integrated in a single module with built-in power control loop.

The two control methods used are open-loop Vcc control (RFMD) and feedback control with current sensing (Renesas, Philips). The reference waveform (TXC) for the control loop comes from the baseband. The output of the PA goes into a low pass filter located inside the FEM (Front End Module). Finally the transmit signal goes through the band selection and TX/RX switches to the antenna port.

The FEM is controlled with four digital control signals (TXP, Vc1, Vc2 and Vc3) to meet the TDMA frame timing requirements.

Transmitter - signal processing

The I/Q signals coming from the baseband section are fed into the modulator and converted up to the carrier frequency. The I/Q are post filtered by a 1st order passive RC filter (discrete components on PWB) and a 3rd order active filter (Legendre type) inside PMB3258.

The nominal output level of the modulator is +3.5 dBm in both bands. The modulator's output is an open-collector type and need an external load and a DC supply feed. The load and the DC supply feed are implemented as the part of the H3 filter.

The filtered signal is fed into the input of the FEM, which amplifies it to the desired power level and provides the signal at the antenna port.

There is also a temperature sensor close to the FEM to enable SW temperature compensation for e.g. the power levels. The sensor is connected to one of the slow ADC channels in the baseband.

VCXO and PLL

The VCO frequency is locked by a PLL (phase locked loop) into a stable frequency source given by a VCXO. The frequency of the VCXO is in turn locked into the frequency of the base station with the help of an AFC (automatic frequency control) voltage, which is generated in the UEM. The reference frequency is 26 MHz.

The VCXO also provides a 26 MHz system clock for the digital baseband.

The PLL is located in PMB3258 and it is controlled via the RFBUS.

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9 — Schematics

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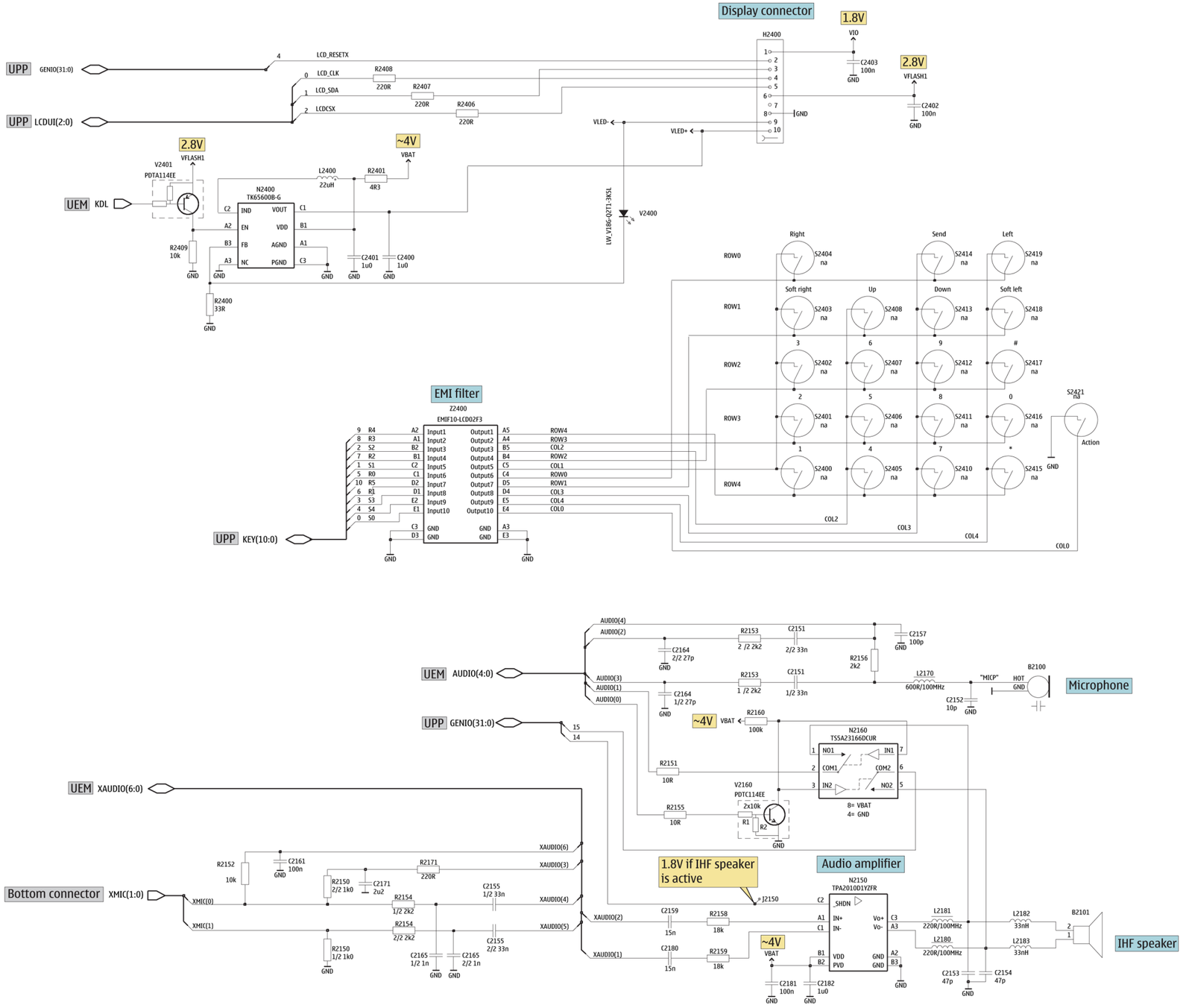
Schematics

UI and audio



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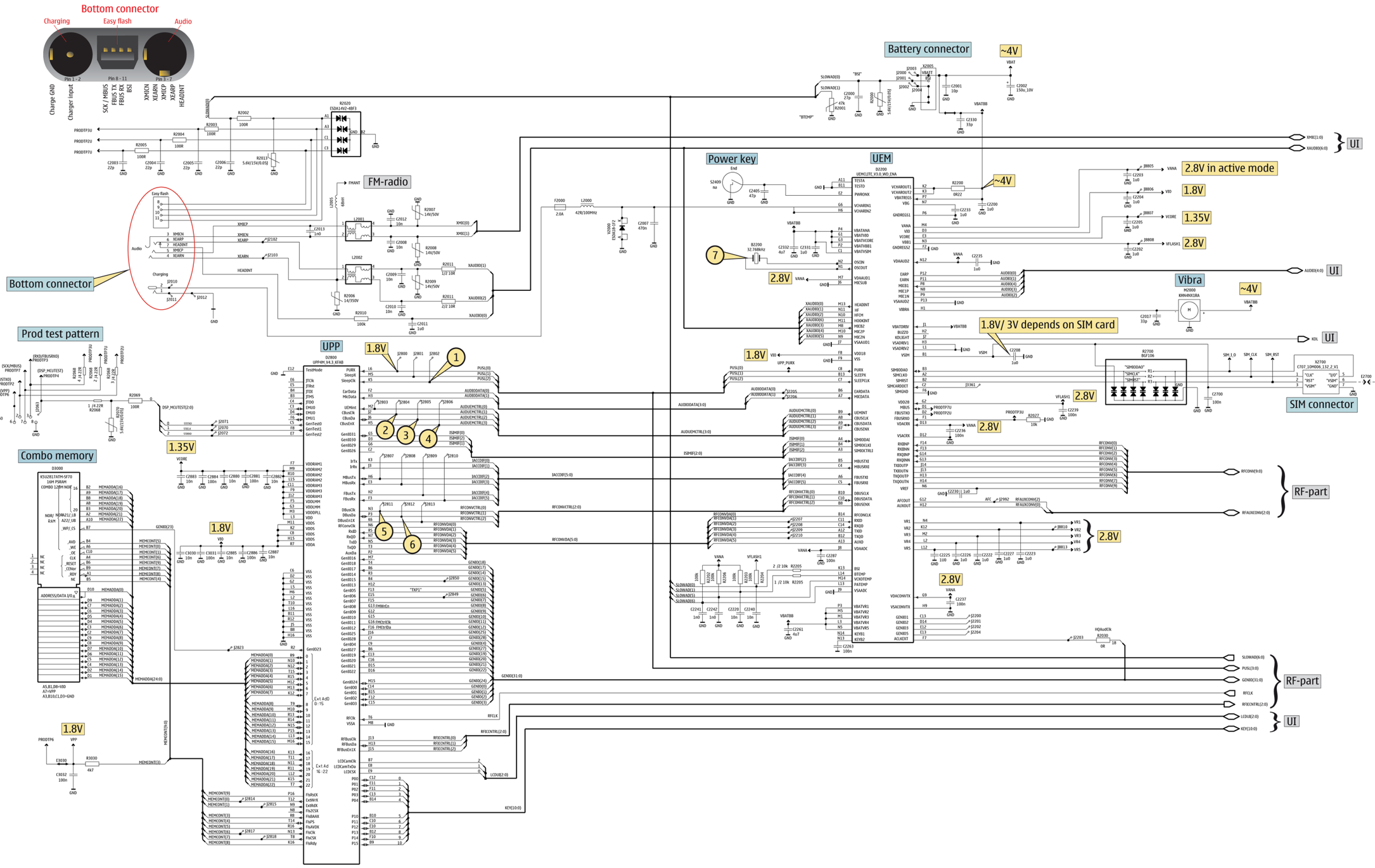
UEM, UPP and Combo memory



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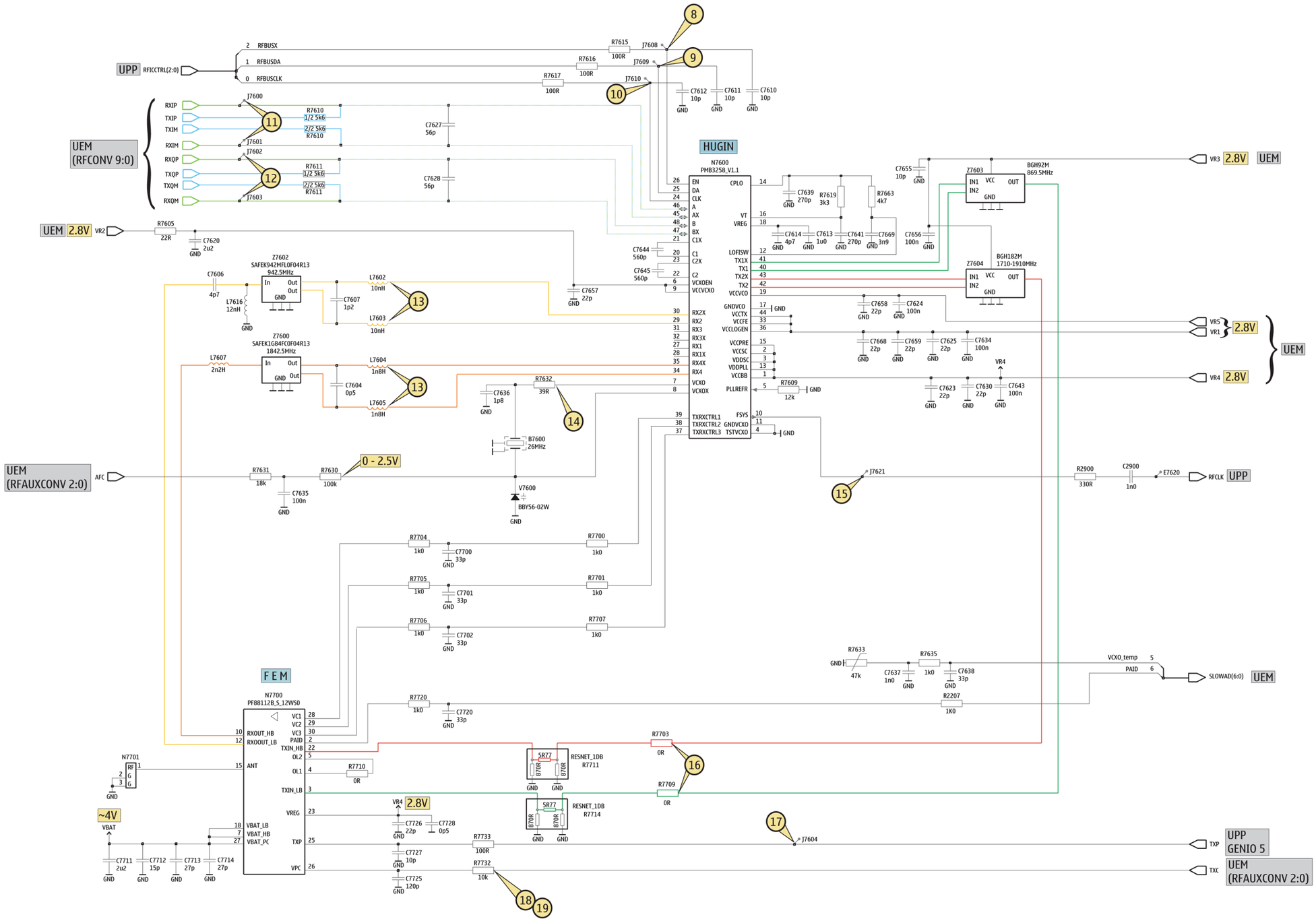
RF-part



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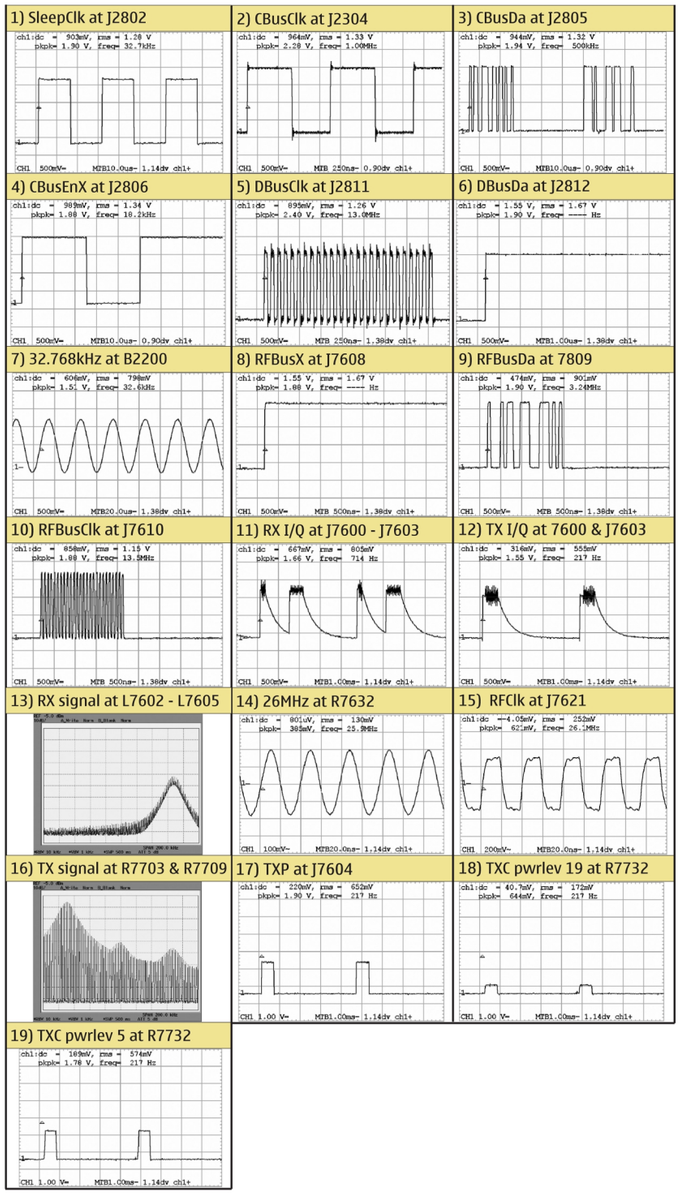
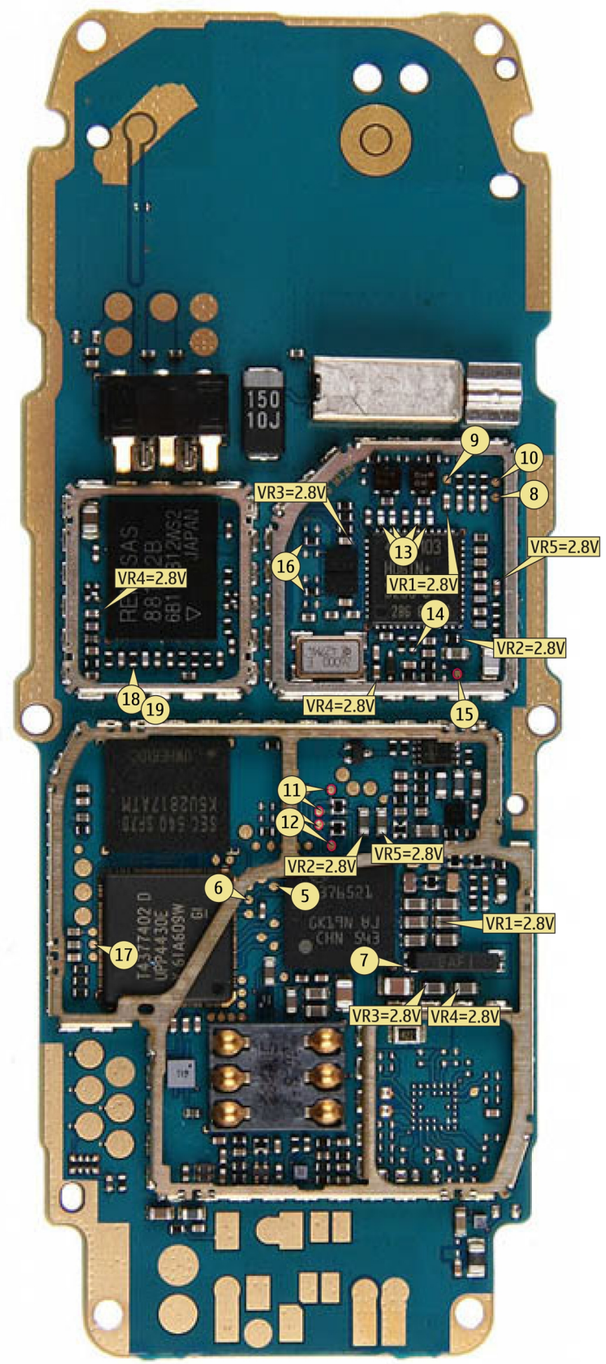
Signal overview





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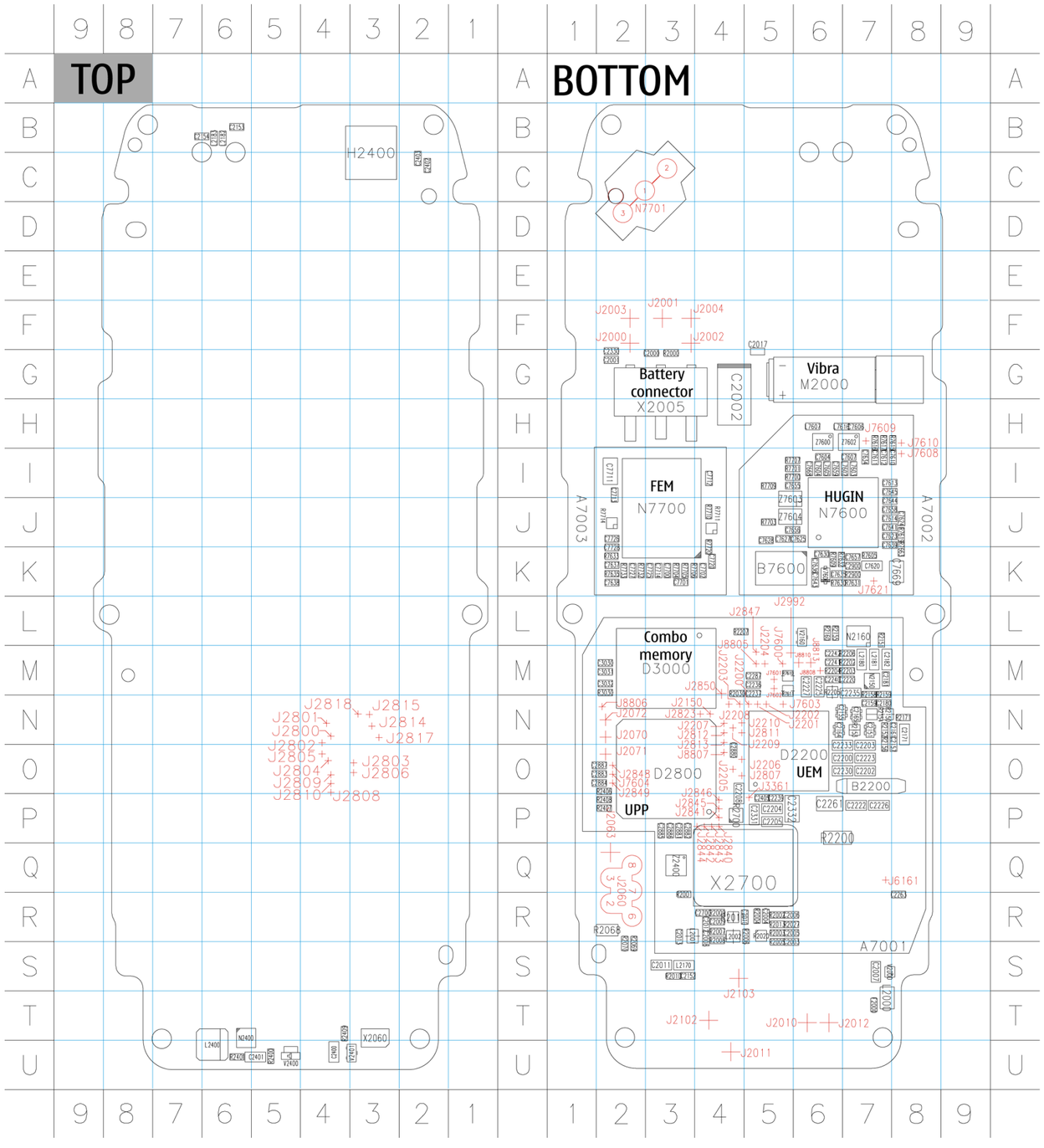
Component finder

B		C2400	U4	C7727	K2	J2843	P4	R2010	S3	R7714	J2
B2200	O7	C2401	U5	C7728	K2	J2844	P4	R2011	R4	R7720	K4
B7600	K5	C2402	C2	D		J2845	P4	R2013	R5	R7732	K2
C		C2403	C2	D2200	O5	J2846	P4	R2020	R5	R7733	K2
C2000	G3	C2405	P5	D2800	O3	J2847	M5	R2027	R5	V	
C2001	G2	C2700	R4	D3000	M3	J2848	O2	R2030	M4	V2000	S7
C2002	G4	C2880	O4	F		J2849	O2	R2068	R2	V2160	L6
C2003	S5	C2881	P3	F2000	T7	J2992	M5	R2069	S2	V2400	U5
C2004	R5	C2882	P3	H		J3361	P5	R2070	S2	V2401	U3
C2005	R5	C2883	O2	H2400	C3	J6161	Q8	R2150	N7	V7600	K6
C2006	R5	C2884	O2	J		J7600	M5	R2151	L7	X	
C2007	S7	C2885	P3	J2000	F2	J7601	M5	R2152	N7	X2005	G3
C2008	R4	C2886	P3	J2001	F3	J7602	M5	R2153	N7	X2060	T3
C2009	R4	C2887	O2	J2002	F3	J7603	N5	R2154	N7	X2700	Q4
C2010	R5	C2900	K7	J2003	F2	J7604	O2	R2155	L6	Z	
C2011	S3	C3030	M2	J2004	F3	J7608	I8	R2156	O7	Z2400	Q3
C2012	R4	C3031	M2	J2010	T6	J7609	H7	R2158	N7	Z7600	H6
C2013	R3	C3032	M2	J2011	U4	J7610	H8	R2159	N7	Z7602	H7
C2017	G5	C7604	I6	J2012	T6	J7621	K7	R2160	L6	Z7603	J5
C2151	N7	C7606	H7	J2060	R2	J8805	M5	R2171	N8	Z7604	J5
C2152	S3	C7607	I7	J2063	Q2	J8806	N2	R2200	P6		
C2153	B6	C7610	I8	J2070	N2	J8807	O4	R2202	M7		
C2154	B7	C7611	I7	J2071	O2	J8808	M6	R2203	M7		
C2155	N6	C7612	I7	J2072	N2	J8810	M6	R2204	M6		
C2157	O8	C7613	I7	J2102	T4	J8813	M6	R2205	M6		
C2159	N7	C7614	J7	J2103	S4	L		R2206	M7		
C2161	N8	C7620	K7	J2150	N4	L2000	T7	R2207	L4		
C2164	N6	C7623	J7	J2200	N5	L2001	R3	R2400	U5		
C2165	N7	C7624	J8	J2201	N5	L2002	R4	R2401	U6		
C2171	N8	C7625	J6	J2202	N5	L2170	S3	R2406	O2		
C2180	N7	C7627	J5	J2203	N4	L2180	M7	R2407	P2		
C2181	M7	C7628	J5	J2204	M5	L2181	M7	R2408	P2		
C2182	M7	C7630	K6	J2205	O4	L2182	B6	R2409	T4		
C2200	O7	C7634	I7	J2206	O4	L2183	B6	R2700	P4		
C2202	O7	C7635	K6	J2207	N4	L2400	U6	R2900	K7		
C2203	O7	C7636	K6	J2208	N4	L7602	I7	R3030	M2		
C2204	P5	C7637	K2	J2209	N4	L7603	I7	R7605	K7		
C2205	P5	C7638	K2	J2210	N4	L7604	I6	R7609	K6		
C2208	P4	C7639	J7	J2800	N4	L7605	I6	R7610	M5		
C2220	M7	C7641	J7	J2801	N4	L7607	H6	R7611	M5		
C2222	P7	C7643	K6	J2802	N4	L7616	H6	R7615	H8		
C2223	O7	C7644	J7	J2803	O3	M		R7616	H7		
C2225	M6	C7645	I7	J2804	O4	M2000	G6	R7617	H7		
C2226	P7	C7655	I5	J2805	O4	N		R7619	J8		
C2227	M6	C7656	J5	J2806	O3	N2150	M7	R7630	K6		
C2230	O7	C7657	K7	J2807	O4	N2160	L7	R7631	K7		
C2233	O7	C7658	J7	J2808	O4	N2400	T6	R7632	K6		
C2235	M7	C7659	I6	J2809	O4	N7600	J7	R7633	K2		
C2236	M5	C7668	I6	J2810	O4	N7700	J3	R7635	K2		
C2237	M5	C7669	K8	J2811	N4	R		R7663	K8		
C2239	P5	C7700	K3	J2812	N4	R2000	G3	R7700	I5		
C2240	M6	C7701	K3	J2813	N4	R2001	R3	R7701	I5		
C2241	M6	C7702	K4	J2814	N3	R2002	R5	R7703	J5		
C2242	M6	C7711	I2	J2815	N3	R2003	R5	R7704	K3		
C2261	P6	C7712	I4	J2817	N3	R2004	R5	R7705	K3		
C2263	R8	C7713	I2	J2818	N3	R2005	S5	R7706	K3		
C2287	M5	C7714	K3	J2823	N4	R2006	R5	R7707	I5		
C2330	G2	C7720	K4	J2840	P4	R2007	R4	R7709	I5		
C2331	P5	C7725	K3	J2841	P4	R2008	S4	R7710	J4		
C2332	P5	C7726	J2	J2842	P4	R2009	R4	R7711	J4		



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Glossary

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A/D-converter	Analog-to-digital converter
ACI	Accessory Control Interface
ADC	Analog-to-digital converter
ADSP	Application DPS (expected to run high level tasks)
AGC	Automatic gain control (maintains volume)
ALS	Ambient light sensor
AMSL	After Market Service Leader
ARM	Advanced RISC Machines
ARPU	Average revenue per user (per month or per year)
ASIC	Application Specific Integrated Circuit
ASIP	Application Specific Interface Protector
B2B	Board to board, connector between PWB and UI board
BB	Baseband
BC02	Bluetooth module made by CSR
BIQUAD	Bi-quadratic ,type of filter function)
BSI	Battery Size Indicator
BT	Bluetooth
CBus	MCU controlled serial bus connected to UPP_WD2,UEME and Zocus
CCP	Compact Camera Port
CDSP	Cellular DSP (expected to run at low levels)
CLDC	Connected limited device configuration
CMOS	Complimentary metal-oxide semiconductor circuit (low power consumption)
COF	Chip on Foil
COG	Chip on Glass
CPU	Central Processing Unit
CSR	cambridge silicon radio
CSTN	Color Super Twisted Nematic
CTSI	Clock Timing Sleep and interrupt block of Tiku
CW	Continuous wave
D/A-converter	Digital-to-analouge converter
DAC	Digital-to-analouge converter
DBI	Digital Battery Interface
DBus	DSP controlled serial bus connected between UPP_WD2 and Helgo
DCT-4	Digital Core Technology
DMA	Direct memory access
DP	Data Package

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DPLL	Digital Phase Locked Loop
DSP	Digital Signal Processor
DtoS	Differential to Single ended
EDGE	Enhanced data rates for global/GSM evaluation
EGSM	Extended GSM
EM	Energy management
EMC	Electromagnetic compability
EMI	Electromagnetic interference
ESD	Electrostatic discharge
FCI	Functional cover interface
FPS	Flash Programming Tool
FR	Full rate
FSTN	Film compensated super twisted nematic
GND	Ground, conductive mass
GPIB	General-purpose interface bus
GPRS	General Packet Radio Service
GSM	Group Special Mobile/Global System for Mobile communication
HF	Hands free
HFCM	Handsfree Common
HS	Handset
HSCSD	High speed circuit switched data (data transmission connection faster than GSM)
HW	Hardware
I/O	Input/Output
IBAT	Battery current
IC	Integrated circuit
ICHAR	Charger current
IF	Interface
IHF	Integrated hands free
IMEI	International Mobile Equipment Identity
IR	Infrared
IrDA	Infrared Data Associasion
ISA	Intelligent software architecture
JPEG/JPG	Joint Photographic Experts Group
LCD	Liquid Crystal Display
LDO	Low Drop Out
LED	Light-emitting diode

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LPRF	Low Power Radio Frequency
MCU	Micro Controller Unit (microprocessor)
MCU	Multiport control unit
MIC, mic	Microphone
MIDP	Mobile Information Device Profile
MIN	Mobile identification number
MIPS	Million instructions per second
MMC	Multimedia card
MMS	Multimedia messaging service
NTC	Negative temperature coefficient, temperature sensitive resistor used as a temperature sensor
OMA	Object management architechture
OMAP	Operations, maintenance, and administartion part
Opamp	Operational Amplifier
PA	Power amplifier
PDA	Pocket Data Application
PDA	Personal digital assistant
PDRAM	Program/Data RAM (on chip in Tiku)
Phoenix	Software tool of DCT4.x
PIM	Personal Information Management
PLL	Phase locked loop
PM	(Phone) Permanent memory
PUP	General Purpose IO (PIO), USARTS and Pulse Width Modulators
PURX	Power-up reset
PWB	Printed Wiring Board
PWM	Pulse width modulation
RC-filter	Resistance-Capacitance filter
RF	Radio Frequency
RF PopPort TM	Reduced function PopPortTM interface
RFBUS	Serial control Bus For RF
RSK	Right Soft Key
RS-MMC	Reduced size Multi Media Card
RSSI	Receiving signal strength indicator
RST	Reset Switch
RTC	Real Time Clock (provides date and time)
RX	Radio Receiver

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SARAM	Single Access RAM
SAW filter	Surface Acoustic Wave filter
SDRAM	Synchronous Dynamic Random Access Memory
SID	Security ID
SIM	Subscriber Identity Module
SMPS	Switched Mode Power Supply
SNR	Signal-to-noice ratio
SPR	Standard Product requirements
SRAM	Static random access memory
STI	Serial Trace Interface
SW	Software
SWIM	Subscriber/Wallet Identification Module
TCXO	Temperature controlled Oscillator
Tiku	Finnish for Chip, Successor of the UPP, Official Tiku3G
TX	Radio Transmitter
UART	Universal asynchronous receiver/transmitter
UEME	Universal Energy Management chip (Enhanced version)
UEMEK	See UEME
UI	User Interface
UPP	Universal Phone Processor
UPP_WD2	Communicator version of DCT4 system ASIC
USB	Universal Serial Bus
VBAT	Battery voltage
VCHAR	Charger voltage
VCO	Voltage controlled oscillator
VCTCXO	Voltage Controlled Temperature Compensated Crystal Oscillator
VCXO	Voltage Controlled Crystal Oscillator
Vp-p	Peak-to-peak voltage
VSIM	SIM voltage
WAP	Wireless application protocol
WD	Watchdog
XHTML	Extensible hypertext markup language
Zocus	Current sensor, (used to monitor the current flow to and from the battery)

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